STEEL The Metalworking Weekly

A PENTON PUBLICATION

FEBRUARY 6, 1961

Minors Make a Major Market

Page 43

Two Step Depreciation Reform Coming 37

Wire's Getting More Versatile 47

What Vacuum Furnaces Can Do for You 70

How U. S. Calibrates Master Gages 82

METALWORKING WEEK—PAGE 17

COMPLETE CONTENTS—PAGE 19

UNIVERSAL GRINDING

Reversing the Cost Trend

by Clifford G. Menard
Consulting Engineer
The Heald Machine Company

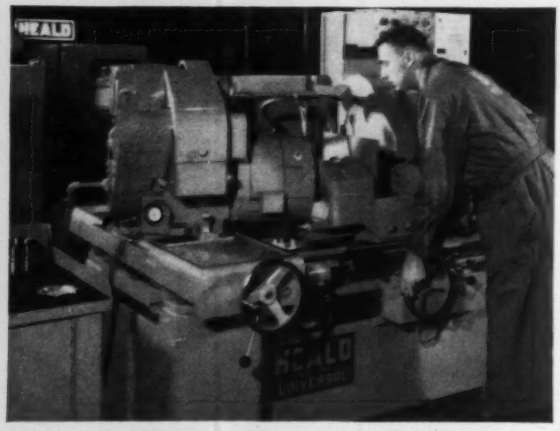
Just about everything costs *more* these days—*much* more than it did 10 or 15 years ago. And when we first decided to build a completely new Universal Internal Grinding Machine that would not only "hold the line", but actually *reverse* the upward cost trend, many an eyebrow was lifted in disbelief. Some said it couldn't be done. Others felt that major economies could be made only with a big sacrifice in performance.

Admittedly, the task was not a simple one. In order to cut costs without cutting quality, we had to make a complete re-evaluation not only of the basic machine design, but of every step of our manufacturing operations as well. But we found that a large number of cost savings could be made, by utilizing the latest advances in machine design and streamlining production methods to eliminate as many manual operations as possible. Although most of the savings were relatively small individually, they added up to a major reduction in manufacturing cost.

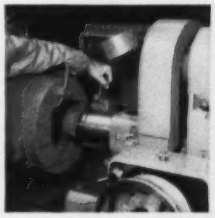
This better, more versatile general purpose grinder costs about *half* as much as comparable machines today, and *less* than similar machines (with fewer features) cost in 1947!

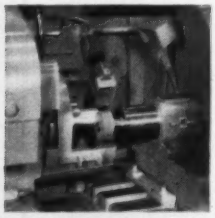
Here's how some of the savings were made. The use of hydrostatic table ways eliminated an expensive booster arrangement in the hand table feed. An externally-mounted valve "package", on the front of the machine, simplified the hydraulic power arrangement and eliminated all but essential units in the hydraulic system. And with all hydraulics outside of the machine, the base is mechanically stronger and less expensive to produce because there are fewer holes and less surface area to finish. Furthermore, simplified basic engineering and construction make it possible to build this standard machine with standard arrangement on a STOCK basis resulting in shorter deliveries.

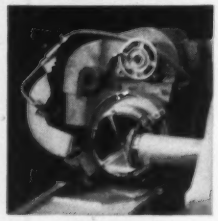
These and other refinements enabled us to make the 273A a truly universal machine with greater capacity, easier operation, and inherent precision that holds tolerances within .0001″ in normal production and .000050″ in special cases. Yet its 1947 price tag puts it within the economic reach of virtually every plant or machine shop, regardless of size.



Here's the new Model 273A Universal, on display at the 1960 Machine Tool Exposition. On a steel test piece, the O.D., a straight bore, a tapered bore and the face were ground to size within .0001″ at a single chucking.







Workhead swivel of 90°, several wheelhead positions, permit I.D., O.D. and rotary surface grinding of parts up to 12″ in diameter. Vari-speed workhead drive is infinitely adjustable from 75 to 450 rpm.

Ask your Heald Engineer for the complete UNIVERSAL story. Then compare its performance and cost with any other similar machine available today!

THE HEALD MACHINE COMPANY
Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts

Only sheets of steel can endure this annual 50-mile hike

To keep a 100-by-150-foot lawn in trim a power mower churns and chatters more than 50 miles in a single season. A mower needs plenty of strength to stand up under all the hard knocks and vibration!

That's why so many lawnmower parts—handles, housings, decks—are formed from sturdy steel sheets. No cracking, no buckling, no twisting or working loose when parts are made of durable sheets of steel.

So whether your product is a mower or a motor vehicle, you're on solid ground when you design and work with sheet steel. Bethlehem can furnish the sheets you need for the job, in a wide variety of gages, tempers, and surface finishes. And our engineers will be glad to pitch in on your technical problems.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

Steel *for Strength*
. . . Economy
. . . Versatility

BETHLEHEM STEEL

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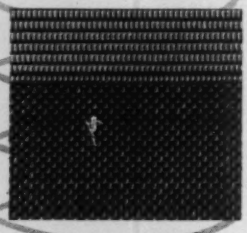
PRECISION
FINE WIRE
STAINLESS
AND OTHER
ALLOYS
FWM
FORT WAYNE METALS, INC.
3211 MacARTHUR DRIVE
FORT WAYNE, INDIANA

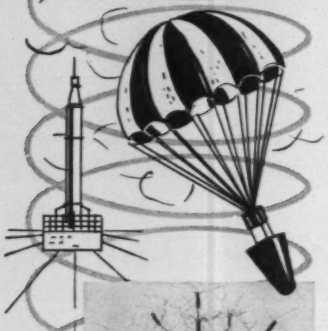
When you need something special in precision alloy wire ideas see what Fort Wayne Metals can do...

Precision stainless alloy wire is always something new at Fort Wayne Metals.

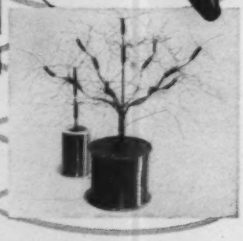
From pot scrubbers to space vehicles, wherever IDEAS are needed in stainless alloy wire, the nation's wire fabricating industry increasingly turns to FWM. This is so because FWM is a pioneering firm in the development of new wire concepts.



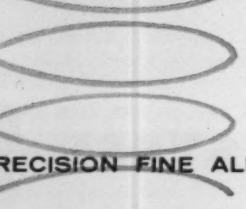
Take ultra fine filters, for instance. For years, weavers of this finer-than-hair material—with over a million openings per square inch—suffered unduly from breakage while fabricating or testing the filter cloth. Rejects were high, and production speed, slow. FWM's research revealed that tiny inclusions in the wire caused the trouble. New methods of wire testing and selection, devised by FWM, are now saving a great deal of money for precision weavers. This type of FWM wire is now the industry's most reliable and most uniform in high quality.



Take space capsule recovery problems, for instance. No organic fabric could stand the friction heat generated, as a capsule parabrake opens at the edge of space to slow and orient the capsule on its earthward descent. FWM developed drawing methods for high temperature fine alloy wire, which, when woven into parabrake cloth, provides more drag than organic fabric and maintains its strength at temperatures up to 1800°F.



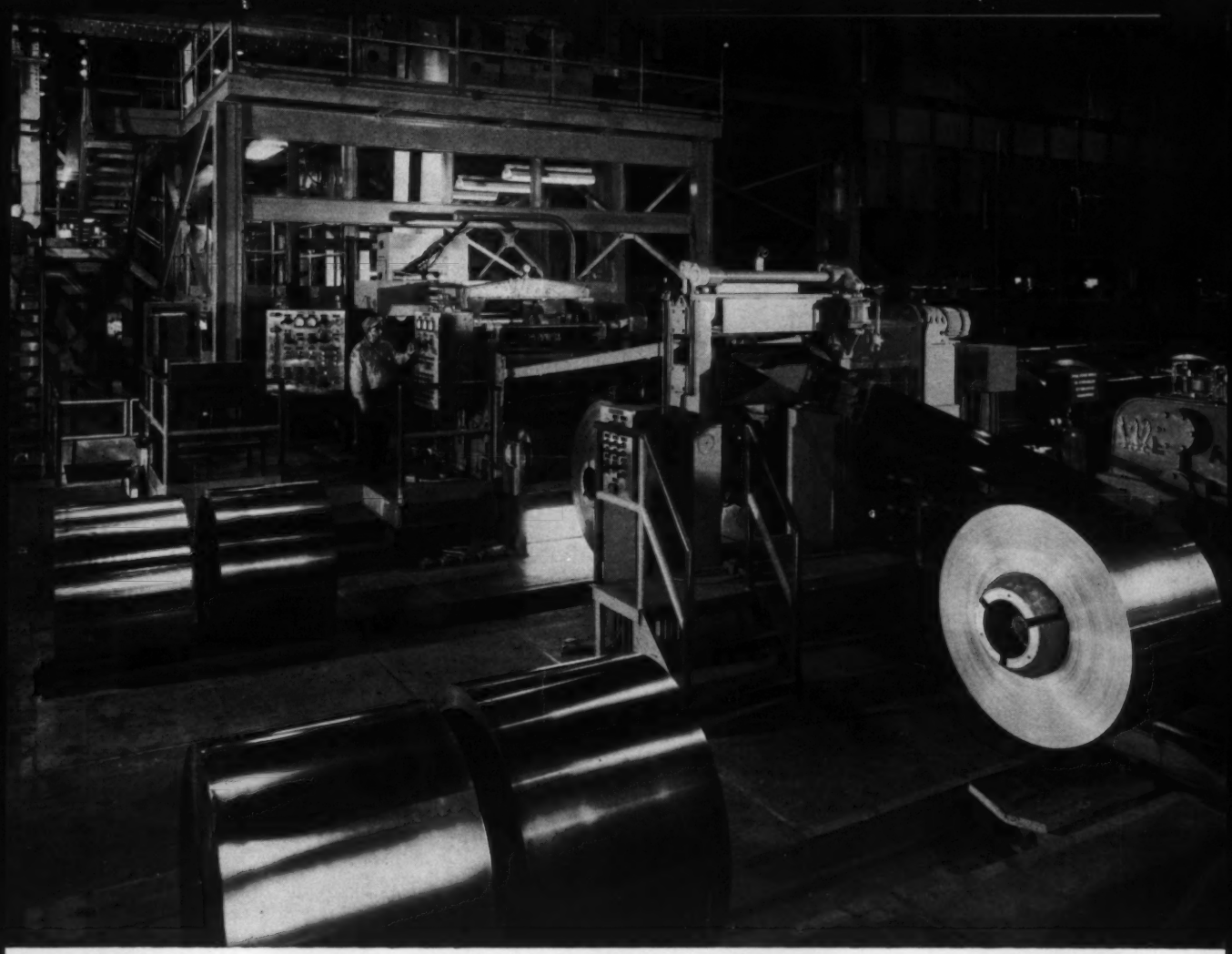
Or take aircraft control cabling. Here, light weight combined with high strength and reliability are all-important; yet makers of high performance cable had to produce an extra heavy product to obtain the extra margin of safety. FWM developed a "selective tempering" process, in which each strand of wire is treated to meet the different kinds of stress it would encounter, depending on its designated position in the cable structure. The result was about a 20% improvement in cable efficiency and an 80% improvement in fatigue resistance. Now, with lighter cable, it is possible to accomplish the same job with a greater degree of safety.



Take ANY precision alloy wire problem you like. If FWM has not already solved it, there is an excellent chance that we will—when you tell us about it.

FOR SPECIAL APPLICATIONS, CALL OR WRITE...
FORT WAYNE METALS, INC.
SHERWOOD 4154 • 3211 MACARTHUR DRIVE
FORT WAYNE, INDIANA

PRECISION FINE ALLOY WIRE • RESEARCH, DEVELOPMENT AND PRODUCTION



Columbia-Geneva Steel increases tin plate production with third Wean Electrolytic Tinning Line

A third Wean Electrolytic Tinning Line was installed recently by Columbia-Geneva Steel Division of United States Steel Corporation to meet the growing demand for high-quality tin plate on the West Coast. This high-speed "Ferrostan" line incorporates the most modern engineering advances in design and construction of continuous processing lines.

This modern line is among the first to employ an electronic data-logging system to provide a "process profile" of all coiled tin plate. Other new features include improved conductor roll mountings for more rigid support, easily replaced cartridge seals for submerged rolls, and air cylinder-controlled hold-down rolls for faster, more convenient adjustment.

Exit end equipment provides for both recoiling and shearing. A pay-off reel is included to permit shearing and classification of finished coils while the strip being processed is recoiled.

Fifty-one of the world's electrolytic tinning lines carry the Wean name and process over 80% of all electrolytic tin plate produced today. Wean's pioneer experience in continuous processing line equipment has served every major steel firm during the past thirty years. Wean's experience and "creative engineering" stand ready to serve you.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

When you want it to stay together . . . RIVET it together

The strong, permanent grip of solid steel rivets has yet to find its equal in any other type of fastener. Rivets save money, save space and save problems. Once in place, you can depend on their tremendous strength forever.

THE CHAMPION RIVET COMPANY
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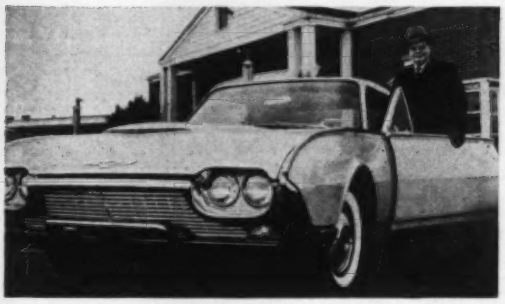
For permanence, you can't beat rivets.

CLEVELAND 5, OHIO • EAST CHICAGO, INDIANA

Wide selection of 3/16″ to 2″ diameter rivets in stock, available for immediate shipment. Send for complete catalog showing sizes, specifications, heating charts.

Top Winner Makes a Choice



Beat-the-Experts winner for calendar 1960 is J. E. Baldridge, comptroller, Quality Mill Supply Co., Columbus, Ind. After looking over the line of Ford Div. cars, he settled on driving a Thunderbird for two weeks. That privilege is his prize.

Mr. Baldridge made the closest estimate of passenger car production in the history of the contests. He pegged it just 78 units under the preliminary figure of 6,694,306, provided by our contest authority, *Ward's Automotive Reports*.

Runners Up

The other five winners, out of 1100 entrants, received handsome color prints of a dream car prepared especially for runners-up by Virgil M. Exner, Chrysler Corp. vice president and director of styling.

Here's how they came under the wire: R. B. Dodds, manager service, Worthington Corp., Wellsville, N. Y., 910 units off the mark; Joe Williams, assistant superintendent, Ceco Steel Products Corp., Kansas City, Kans., 5007 off; Joseph J. Gutos, director, community relations, Keystone Steel & Wire Co., Peoria, Ill., 7438 off; Elmer R. Stafford, purchasing agent, New England Brass Co., Taunton, Mass., 10,869 off; Edward P. Steele, supervisor-tool records, Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J., 11,234 off.

Comment on People Power

"I found 'People Power' (STEEL, Jan. 2, p. 89) a thorough and informative article. Congratulations on the excellent job done on this difficult subject"—Robert E. Hynes, Pittsburgh Steel Co.

"Your article on 'People Power' is one of the most valuable contributions to a real problem that I have ever read"—David J. O'Neil, Carpenter Steel Co.

"Outstanding. . ."—A. L. Bartz, American Steel & Wire Div., U. S. Steel Corp.

"Absolutely terrific . . . hard hitting, with good objectivity"—Arthur Gale, Research Institute of America.

Those are just a few comments from more than 200 letters the editors have received concerning their impact report in the yearbook on how to use human resources more effectively. Readers have ordered more than 1000 reprints to date. Bound copies are available at $2 each; prices for larger quantities on request. Write Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio.

Of all the letters, our favorite is from Rud. Zwingli of Toronto, Ont. He refers to the article's statement that "we're getting an efficiency as low as 30 per cent from some clerical people." Writes Mr. Zwingli: "Please introduce me to firms that had that sad experience. I consider myself to be far above 30 per cent efficient in clerical work and would like to be able to show my abilities to any firm." Any takers?

Men of Industry

On Jan. 16, we mentioned that the editors were considering changing the name of our "Men of Industry" section because an occasional woman is now winning a metalworking post. What a hornet's nest we ran into! A large majority (of men) want no change. Howard C. Fell of Guilford, N. Y., summarizes their position: "Shades of Tom Girdler! Has the steel mill gone the way of the barber shop?"

Reprint Recap

Geraldine, our cleaning woman and night editor, has been exercising the adding machine for several evenings. She has come up with these statistics:

Individual letters requesting reprints of STEEL articles—

1960	19,496
1959	10,506
1958	10,053

Total reprints ordered—

1960	648,741
1959	487,193
1958	376,266

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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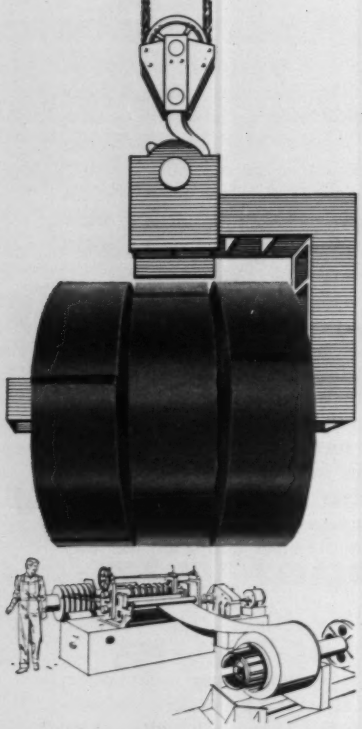

Investigate the many advantages of YODER-engineered Slitter Installations. Write today for the comprehensive, 80 page YODER Slitter Manual ... it's yours for the asking!

THE YODER COMPANY
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Fluid Power NEWS

OILGEAR 40 Years of Fluid Power

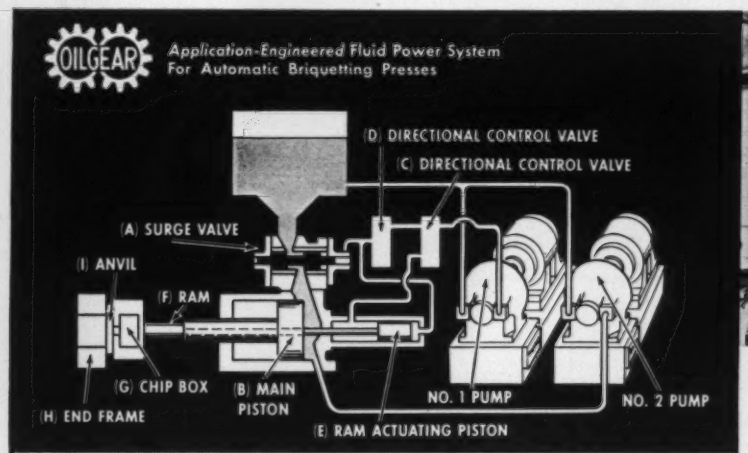
From Oilgear *Application-Engineering* Files

HOW OILGEAR-EQUIPPED BRIQUETTING PRESSES PRODUCE MORE—LONGER—AUTOMATICALLY

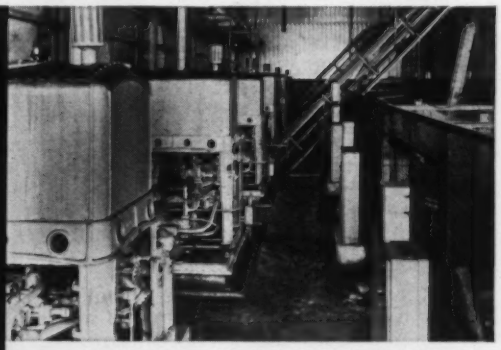
CUSTOMER: *Milwaukee Foundry Equipment Division of SPO Inc.*

DATA: To power a line of presses specially designed for low cost, rapid conversion of bulky, low-grade metal turnings and borings into dense, uniform-sized briquettes to: conserve storage space; simplify handling; prevent storage oxidation—particularly with finely divided metals or sponge iron; provide sufficient density and size to melt rather than flash into oxide on entry into foundry cupola; control metal content; provide a simple means of accurate compounding for alloying or supplying a flux.

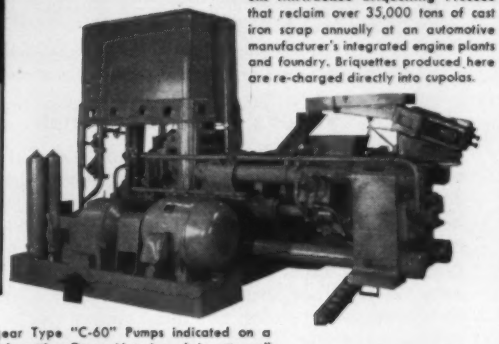
PRESS SYSTEM REQUIREMENTS: 1. Eliminate wear and maintenance costs resulting from use of gears and bearings. 2. To be controlled hydraulically, electrically, or electrohydraulically for automatic cycling at rates ranging from 9 to 17 strokes per minute. 3. Sufficient force to provide briquette densities of 70 to 80% with conservative pump loading. 4. Long life, rugged dependability . . . capable of years of continuous operation with an absolute minimum of maintenance.



HOW IT WORKS: Oilgear Pump No. 1 is the main operating pump. Oilgear Pump No. 2 supplements fluid for a high-speed compression stroke. Cycle starts with fluid from No. 1 Pump through Oilgear Directional Control Valves (C, D) to Ram Actuating Piston (E), moving Ram (F) forward in Chip Box (G) at high speed and transferring loose material into the die. Surge Valve (A) is open to provide gravity flow of fluid from Reservoir (H) to Main Cylinder (B). When a preset pressure is reached, Surge Valve (A) closes, and fluid from Pump No. 1 is delivered to both Ram Actuating Piston (E) and Main Piston (B) with output of Pump No. 2 added for final compression stroke. When maximum preset briquetting pressure is reached, Valve (D) automatically directs fluid to a stripping piston, removing die held in Chip Box (G) from formed briquette. Chip Box movement trips a switch causing Valve (C) to direct fluid to open Surge Valve (A) and retract Ram Actuating Piston (E) and Ram (F) at high speed. Finished briquette drops out and a new cycle is automatically started. Processing cast iron borings on the two-pump press is completed in 5 or 6 seconds—10 to 12 cycles per minute, to produce up to 700 ten-pound briquettes—better than 3 tons of ideal cupola scrap every hour. These two-pump-system presses have over 40% more output than an identical press with a single pump.



Six Milwaukee Briquetting Presses that reclaim over 35,000 tons of cast iron scrap annually at an automotive manufacturer's integrated engine plants and foundry. Briquettes produced here are re-charged directly into cupolas.



One of the two Oilgear Type "C-60" Pumps indicated on a 350-ton **Milwaukee Briquetting Press.** Note how briquettes roll out of the press to be picked up by magnets.

SOLUTION: Oilgear *Application-Engineered* systems consisting of Oilgear Type "C" Heavy-Duty Constant Displacement Radial Rolling Piston Pumps and Directional Control Valves. Pump requirements range from 23 gpm on the 75-ton Presses to 325 gpm on new 1000-ton presses. *Milwaukee Foundry Equipment*—builder of over 80% of all briquetting presses, and an exclusive user of Oilgear Fluid Power Systems since 1927—recently reported: "*We just modernized a press that had been in continuous cast iron briquetting operation for over 18 years . . . there had been no reported major maintenance . . . the Oilgear components still operated fine—with no appreciable signs of wear or loss in efficiency.*"

This is just one evidence—out of hundreds—of the long service life of Oilgear Systems. Ten or more years of continuous service is common with Oilgear equipment, rather than the exception . . . with many of these systems operating under adverse conditions—rapid cycling, grit-laden air, heat, and extreme humidity. Where the going is toughest—Oilgear Pumps just keep rolling along . . . quietly, efficiently.

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .

"for the lowest cost per year . . . it's Oilgear!"

For solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414

FASTENOMICS

TIPS ON FASTENER APPLICATIONS BY STANSCREW

Socket Screw Standards Changed

Check Dimensional Revisions Now to Avoid Extra Costs

Important changes are now in progress in the socket screw industry. Every user should know the details and take appropriate action to avoid higher costs in the future. As a public service, Stanscrew is issuing this progress report.

New Standards Adopted

Exhaustive industry-wide studies, begun in 1954, culminated in 1959 with the adoption of new dimensional standards for socket head cap screws. Standard Screw participated in these studies and concurred in industry recommendations. The new standards, known as the "1960 Series", include changes in head diameters, socket sizes, and thread lengths.

Advantages of New Design

The "1960 Series" has been carefully engineered so there is functional uniformity for all sizes, particularly as applied to wrenching areas and to the relationship of head diameters to body diameters. It offers these important advantages over the previous design, known as the "1936 Series":

1. Larger wrenching area permits applications of clamping force . . . provides maximum utilization of fastener's inherent strength.
2. Provides increased bearing surface under the head . . . up to 233% more.
3. Minimum indentation . . . particularly important with softer metals.

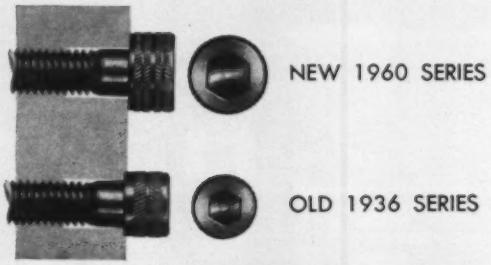
What's Available When

When the "1960 Series" was announced in 1959, it was believed it would become the only standard as of Jan. 1, 1961 and, thereafter, all "1936 Series" would be available only on special order. As previously announced, all sizes in the "1960 Series" are being supplied as standard. However, to make the transition as easy as possible, Stanscrew and other leading producers have extended the changeover period for certain sizes of the "1936 Series".

These are the sizes . . . 5/16", 7/16", 5/8", 3/4", 7/8" and 1" . . . for which the new standards include a change both in head diameter and socket width across flats. Until Jan. 1, 1963 both the "1936 Series" and "1960 Series" will be considered standard ir these six sizes.

For all sizes, however, thread lengths are now being manufactured to "1960" standards. Once current inventories are depleted, "1936 Series" thread lengths will be available on special order only. Based on exhaustive surveys, this will prove no problem in the overwhelming majority of applications.

In some sizes . . . #1, #2, #4, #6, and #8 . . . head diameters are the same, but there has been a change in the socket width. In these sizes, current production is to "1960 Series" dimensions. These sizes are also available in the "1936 Series" until present stocks are depleted, but thereafter only on special order.



Change In Your Designs Essential

This industry program makes it essential that you review product designs to avoid future difficulties. All products now on your drawing boards should incorporate the "1960 Series" socket cap screws wherever possible. And, during the next two years, it is recommended you take advantage of model changes or other opportunities to change existing applications of the "1936 Series" to the "1960" standards. Failure to make provisions could result in procurement difficulties or the higher costs of non-standard items.

Complete Design Information Available

Stanscrew has prepared an up-to-date brochure giving complete information on all steps in this important transition, together with complete design data on both the "1960" and "1936 Series". You can obtain your copy through your local Stanscrew distributor. Call him today.

STANSCREW FASTENERS

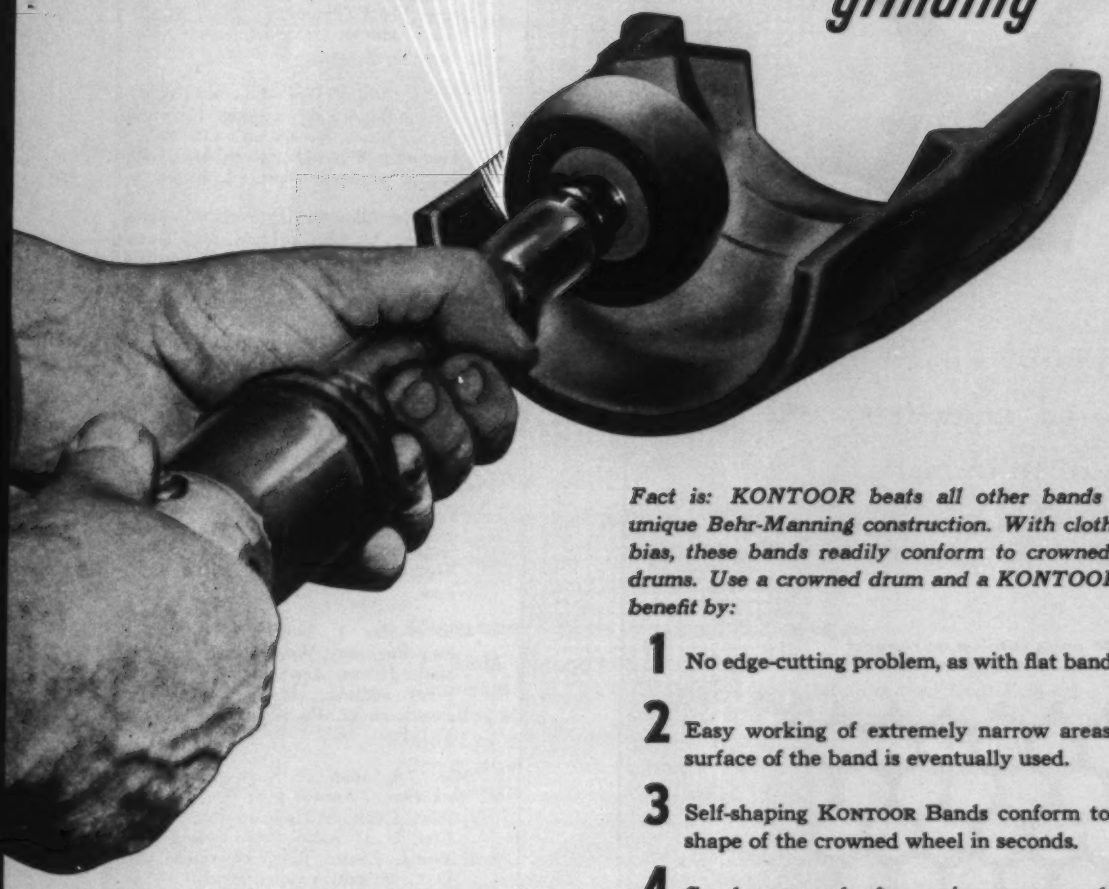
CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

ANOTHER NORTON PRODUCT

New "KONTOOR" Bands

6 ways better for pneumatic drum grinding



Fact is: KONTOOR beats all other bands because of unique Behr-Manning construction. With cloth cut on the bias, these bands readily conform to crowned pneumatic drums. Use a crowned drum and a KONTOOR Band and benefit by:

1. No edge-cutting problem, as with flat bands.
2. Easy working of extremely narrow areas; the entire surface of the band is eventually used.
3. Self-shaping KONTOOR Bands conform to the curved shape of the crowned wheel in seconds.
4. Can be run under lower air pressure; reduces chatter marks while blending and finishing.
5. Crowned band is ideal for working on curves; especially on internal surfaces.
6. KONTOOR Bands have the non-loading and non-shedding advantages of RESINALL bond.

Ask for a demonstration. Call your nearest representative or write Dept. S-2, BEHR-MANNING Co., Troy, N. Y., a division of Norton Company.

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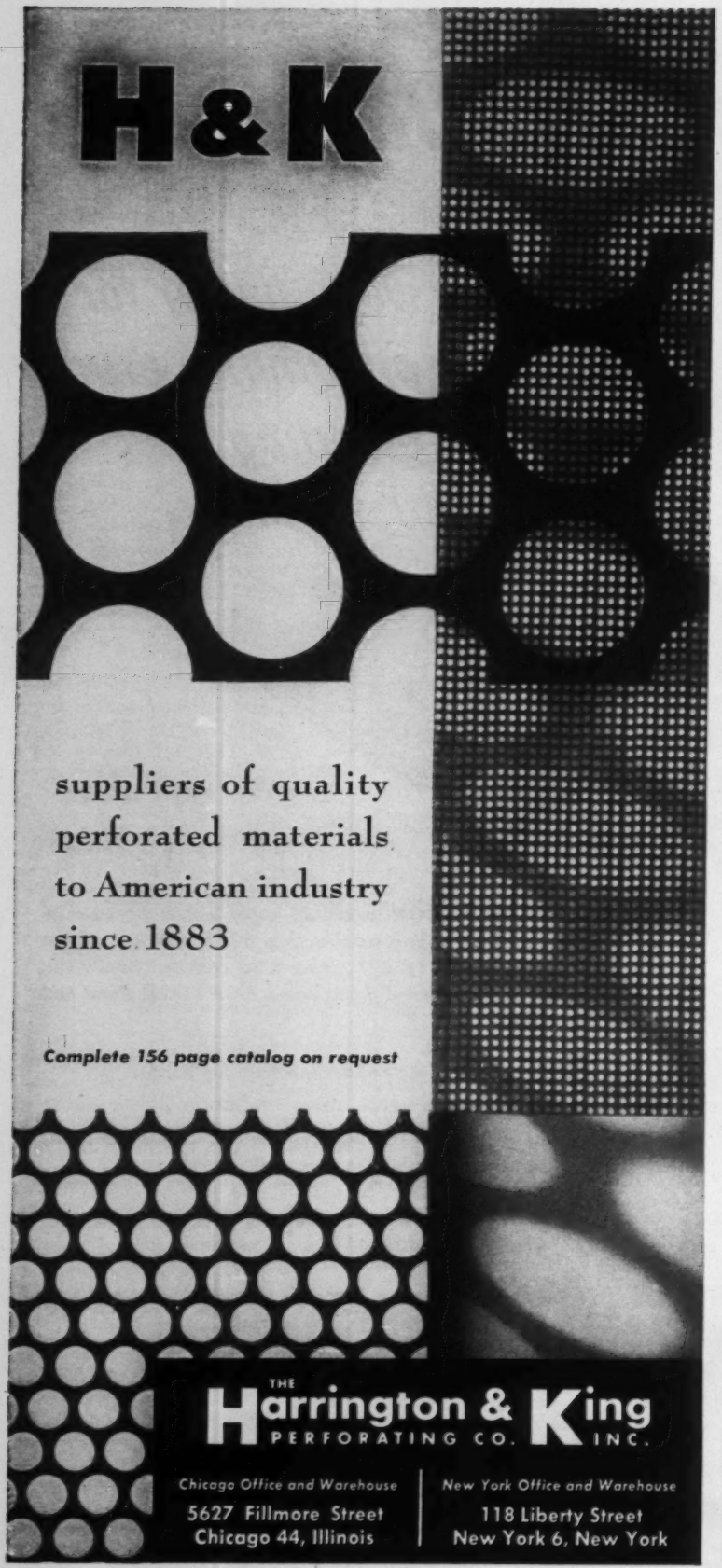
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CALENDAR
OF MEETINGS

Feb. 15-17, American Management Association: Marketing conference, Hotel Roosevelt, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 16-17, National Industrial Conference Board Inc.: General session for all associates, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Feb. 20-22, American Management Association: General management conference, Hotel Olympic, Seattle. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 23, Cutting Tool Manufacturers Association: Annual meeting, Harmonie Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Feb. 23-24, Alloy Casting Institute: Winter meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

Feb. 26-Mar. 1, American Institute of Chemical Engineers: 44th national meeting, Hotel Roosevelt, New Orleans. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Antwerpen.

Feb. 26-Mar. 2, Metallurgical Society of AIME: Annual meeting, Ambassador and Chase-Park Plaza Hotels, St. Louis. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Feb. 27-Mar. 1, Association of Iron & Steel Engineers: Western meeting, Hotel Statler-Hilton, Los Angeles. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Mar. 5-8, American Road Builders Association: Annual convention and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: L. W. Prentiss.

Mar. 5-9, American Society of Mechanical Engineers: Gas turbine power conference and exhibit, Shoreham Hotel, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Mar. 6-8, American Management Association: Data processing conference and exhibit, Statler-Hilton Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

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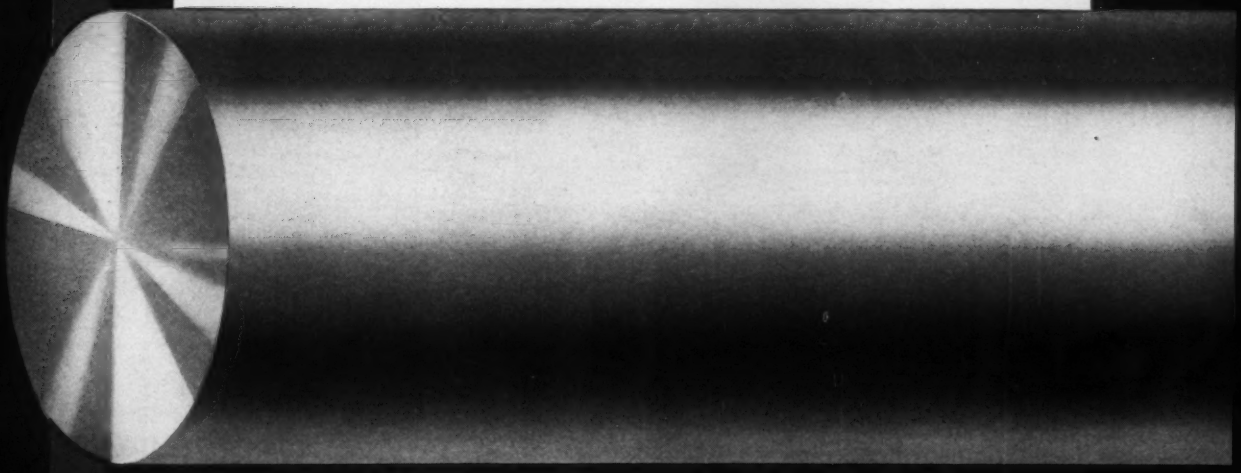
- **e.t.d. 150 Alloy machines better than heat treated alloy steels!**



Here are cost-reducing advantages

(1) Heat treating problems, costs (and secondary operations) are eliminated. (2) "e.t.d." 150 machines better than heat treated in-the-bar alloy steels. (3) Tool life and finish are excellent. (4) No quench cracks or distortion from heat treatment. (5) "e.t.d." 150 has exceptional strength and hardness uniformity across the bar. (6) End cost of parts is greatly reduced.

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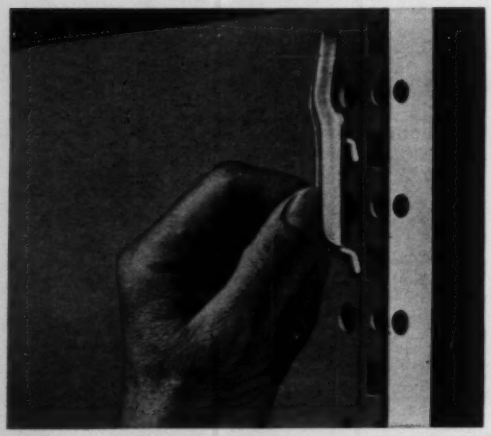
Republic Steel Lockers were selected by a leading West Coast manufacturer for their new wash-change-dress facilities. Republic Box Type Lockers on the outer wall are used for storing and protecting valuable employee tool kits. For complete planning and installation assistance, call your Republic representative, or write today.

THE NEW REPUBLIC SHELF CLIP is designed to ease and speed erection: to provide quick rearrangement of parts without dissassembling the unit; and to assure a sturdy, rigid, installation. Republic Clip Shelving saves valuable floor space, saves time and money too. Call or write for more information.



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ONE KEY TO COST CONTROL IN '61

Savings like these through Metalogics*

Look at these random examples and see how Ryerson Metalogics sparks real savings for hundreds of companies—in helping to search out new materials, new methods, new machines that will do the job better.

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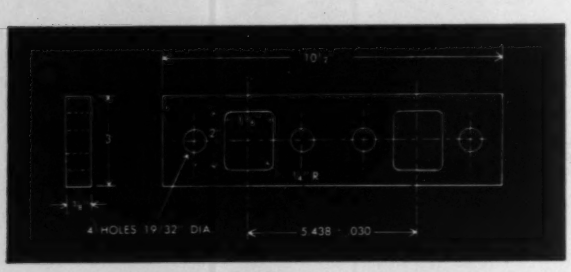
1. Exceptional knowledge of metals and their characteristics, gained through a century of service to industry as a supplier of metals and machinery for metal fabrication.
2. The nation's largest stocks of steel and aluminum —plus unsurpassed service on industrial plastics.

Your Ryerson representative is "Metalogics-trained" to help you value-analyze selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

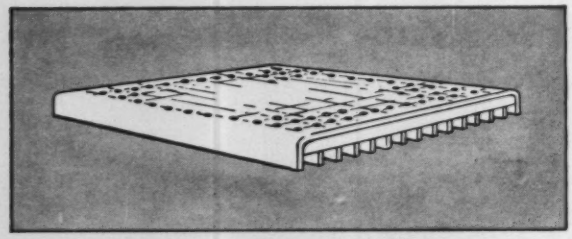
**The Ryerson science of giving optimum value for every purchasing dollar.*



Saved: $100 per thousand

PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜" x 3" bar. Cutting bars to size, burning 1¾" x 2" holes and drilling four 19/32" holes proved time-consuming and expensive.

SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100 per thousand pieces and quickly justified the small initial investment in dies.



Suggestion saves 85%

ASKED FOR: Customer wanted 1" hot rolled plate to cover about 80' of 24" open trench. Plate was to be cut into 24" x 27" segments—each containing 900 ⅜" holes to filter the product.

RECOMMENDED: After studying application and costs, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson's experience and imagination saved 85% of the original cost.

Machine cut rings solve problem

PLATES REQUESTED: Ryerson was asked to bid on supplying ¼" Type 410 stainless in 27½" square plates. Material was to be used for orifice plates for 16" burner, subjected to elevated temperatures.

RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛" diameter length with 13.120" bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an under-driven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.

Production upped 30%

BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 sfm and stepped up production 30%. Ryerson's stocks include the widest range of fast-machining alloys.

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Crucible's Hunter Says Prices Will Not Rise

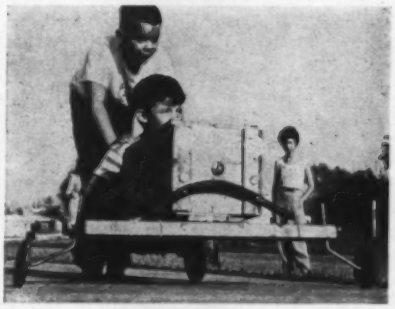
"People would just laugh at us if we tried" to put through a general price increase, Joel Hunter, president, Crucible Steel Co. of America, declares. He sees "no hope" of a general price increase on his firm's line of stainless, alloy, and other specialty steels "for a long time." There are always adjustments to be made on particular items, he says, but the industry has such an excess supply that a general price hike is out of the question. He adds: I wouldn't want to say that we won't ever be able to conform our prices to costs but we can't raise prices until demand catches up to supply and it could be a long time. Meanwhile, he says, the industry will depend on new products and cost reduction breakthroughs for profit improvement.

How Industrial Product Makers Did in 1960

Members of the Resistance Welder Manufacturers' Association received new orders worth $28.9 million in 1960—down 1 per cent from the '59 mark. Shipments rose 15.4 per cent . . . Bookings of fabricated structural steel last year came to 3.2 million tons, the same as the '59 total. Shipments rose 18 per cent, says the American Institute of Steel Construction . . . The index of used machine tool sales compiled by the Machinery Dealers National Association averaged 125.5 in 1960 vs. 135.4 in 1959 (1947-49=100) . . . The bookings index of the American Gear Manufacturers Association rose 8.8 per cent in December to average 235.5 for the year vs. 234.7 in 1959 (1947-49 =100) . . . Net orders for industrial heating equipment in 1960 totaled $76.7 million—down 29 per cent from the '59 volume, reports the Industrial Heating Equipment Association.

Minors Make a Major Metalworking Market

Our population is booming (up 17.2 per cent since 1950). And the under-20 age group is growing even faster. It's a golden marketing opportunity. Teenagers spend more than $9 billion annually. Over $1.7 billion worth of toys were sold last year. There's a market for "adult" goods too: More than 1 million teenagers are married. For more data on the market, see Page 40.

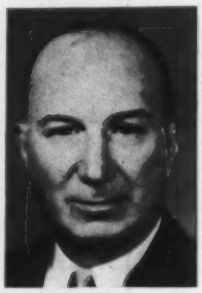


How Consumer Product Makers Fared in 1960

Unit sales of vacuum cleaners during 1960 totaled 3.3 million—down 3.1 per cent from the 1959 mark, says the Vacuum Cleaner Manufacturers Association . . . Unit sales of gas water heaters last year were 2,661,000—9.9 per cent less than the 1959 total, says the Gas Appliance Manufacturers Association . . . In 1960, furniture orders dropped 10 per cent and shipments fell 5 per cent below 1959 totals, says the National Association of Furniture Manufacturers . . . 1960 factory sales of home laundry appliances amounted to

4,663,289 units—14 per cent below the 1959 figure, says the American Home Laundry Manufacturers Association. . . . GAMA says 1960 unit sales of gas ranges fell 3.8 per cent short of 1959's record volume; sales of gas incinerators were down 4 per cent; and sales of gas direct heating units were down 18 per cent.

Wiremakers Push Back Their Horizons

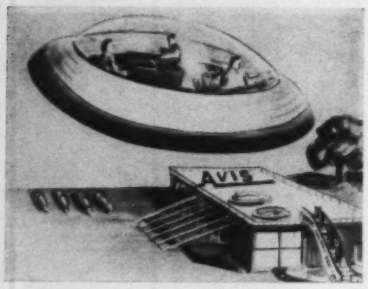


You'll be finding steel wire in unusual places in the future. One wiremaker, American Steel & Wire Div., U. S. Steel Corp., has combined product development and marketing into a single responsibility and is aiming at numerous new markets. Says President Van H. Leichliter: "Our first job is to convert each design and engineering need into an opportunity for wire. We have produced wire with a tensile strength above 600,000 psi, and we're moving rapidly toward the 1 million psi mark." See Page 47.

Pickup in Home Building Predicted

Expect housing starts to rise about 6 per cent this year to an annual rate of 1.3 million units. So says Martin I. Bartling, president, National Association of Home Builders (which held its annual meeting in Chicago last week). John M. Dickerman, executive vice president of NAHB, says there will be more government in housing this year because of the industry's potential role as a business stimulant. The association expects to recommend setting up a central mortgage facility, modifying Federal Housing Administration regulations, and establishing a new type of loan that takes into account the possibility of a home buyer's future increase in income.

Want to Rent a Flying Saucer?



Avis Rent-a-Car System doesn't promise that, but it is planning stations like the one in the photo. They'll dispense atom-powered cars (that will fly or skim along the ground) via remote control automatic methods. Rental agreements would be recorded via TV and tape. And TV would be used to inspect drivers' licenses and charge cards.

Columbium to Be Mined in Canada

St. Lawrence Columbium & Metals Corp. will begin to turn out 500 tons of columbium ore daily this July. The new mining venture is in the Oka region of Quebec, 35 miles west of Montreal. The firm says ore reserves total 62.6 million tons. Anaconda Co. and Kuhn, Loeb & Co. are helping to back the venture.

Cleveland Firms Seek to Triple Aid to Education

Twenty-one Cleveland companies have agreed to "corporate contributions (to education) commencing at once and increasing within three years to a

minimum of 1 per cent of income before taxes, and thereafter gradually increasing as the need develops." Executives of the Cleveland firms are proposing that other companies adopt the same goal. Copies of the proposal are available from the Council for Financial Aid to Education Inc., 6 E. 45th St., New York 17, N. Y.

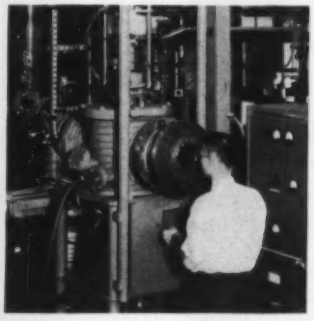
New Tube to Be Heart of Electron Telescope

A new electron imaging tube, placed on a space vehicle, will permit scientists to learn more about the stars. Developed by Westinghouse Electric Corp., the tube is sensitive to ultraviolet light rays that are emitted by celestial bodies but never reach the earth. The tube will become the heart of an electron telescope to be fired into orbit by the National Aeronautics & Space Administration. Information about stars will be telemetered to electronic storage equipment.

Blough Sees 'Signs of Spring'

Roger M. Blough, chairman, U. S. Steel Corp., sees "a few signs of spring appearing." He estimates that consumers have less than 10 million tons of steel in inventory, and says it will be an "inventory miracle" if they can get along with less. He believes orders this quarter will be a shade better than in the fourth quarter. He says tin plate is one of the more active items, there are signs of a pickup in structurals, and appliance makers are beginning to enlarge their buying. He looks for steel imports this year to be as large or larger than those of last year, and he says exports definitely will increase. The corporation reported net income for 1960 of $304,520,681—a return of 8.2 per cent on sales of $3,698,500,000.

What You Should Know about Vacuum Furnaces



If your metalworking plant is medium or large in size, you will probably adapt a vacuum technique to your operation during the coming decade. So believes J. J. Chyle, director of research, A. O. Smith Corp., Milwaukee. He says vacuum technology has great, untapped potential in brazing, heat treating, welding, diffusion bending, metal refining, coating, and many other areas. For help in assessing the process, see Page 70.

Builders Concerned about Export Licenses to Russia

Somebody is playing "now you see it; now you don't" with licenses to export machine tools to Russia. The licenses were issued last summer (STEEL, Aug. 22, 1960, p. 39), but at least two have been suspended (for Jones & Lamson Machine Co. and Bryant Chucking Grinder Co.). The suspensions apparently are linked to an appeal from the Defense Department and a secret meeting of the Senate's Internal Security Subcommittee. A rumor is out that the

STEEL
The Metalworking Weekly

February 6, 1961 Vol. 148 No. 6

CONTENTS

THE EDITOR'S VIEWS:
Engineering Can Be Paid! 33

WINDOWS OF WASHINGTON:
Kennedy Faces Fight on Trade 44

MIRRORS OF MOTORDOM:
Frames Still Favored for Big Cars ..53

THE BUSINESS TREND:
Consensus Puts Upturn in April-May 57

NEWS SECTION:
2 Step Depreciation Reform Coming 37
Du Pont Unveils Vacuum Furnace ..38
Personnel Programs Need Flexibility 39
Minors Make a Major Market 40
Copper Melting Sidestepped 42
Whitecollar Unions Buck Tough Odds 43
Wire's Getting More Versatile 47
Inner Six Ups Iron and Steel Outlays 50
Three New Ore Projects Underway ..66

TECHNICAL SECTION:
Technical Outlook 69
What Vacuum Furnaces Can Do 70
Forging Firm Redesigns, Cuts Costs 74
Machine Topics—Tape Slashes Hole Costs on Structurals 76
Progress in Steelmaking—Basic Oxygen Steelmaking Capacity Soars ..78
Setting the Standards of Industry ..82

MARKET SECTION:
Market Outlook 97
Complete Index to News and Prices 97
Metal Stock Upturn Sighted 99
Steel Imports Exceed Exports 102
Foreign Steel Ban for Roads Gains 102
District Ingot Rates and Chart 104
Ingot Output Turns Down Slightly 104
Scrap Resists Pressure on Prices ..116
Structural Shipments Up in '60 ..117
Nonferrous Metals—Inventory Cutbacks May Be Easing 120

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 61
New Products 87
New Literature 95
Advertising Index 125

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Editorial Index available semiannually.

STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

licenses will be reinstated; they have not been canceled. Without reinstatement, the builders have a problem: Getting rid of machines built to metric standards and for 50 cycle current.

Aluminum Distributors Predict Uptrend

Members of the National Association of Aluminum Distributors are "moderately optimistic" about their 1961 sales prospects. They look for sales during the first half of '61 to be 4 per cent better than those in the like 1960 period. For the year, NAAD believes distributor sales will be 5 to 6 per cent greater than those of 1960. Distributor sales were off 2 per cent in 1960 vs. 1959. (The drop in total aluminum sales was about 5 per cent.)

Mansfield Wants International Copper Cartel

Sen. Michael J. Mansfield (D., Mont.) has proposed the creation of an international copper cartel to regulate prices and production in the depressed industry and has asked President Kennedy to call an international conference to establish the world regulatory force.

More Executives Are Playing Games

More than 100 top corporations are using business gaming to broaden managerial thinking and improve decision making, says Prof. Richard Rawdon of Clarkson College of Technology, Potsdam, N. Y. He says 15,000 middle managers at American Telephone & Telegraph Co. have participated. AT&T calls the technique "by a wide margin the best accepted training program we have yet introduced." More than 1000 General Electric Co. managers have participated in simulated marketing strategy games, says Professor Rawdon, and 85 per cent rate the technique "highly effective." Systems Development Corp. says games are better than any other training technique it has tried. The professor says, however, that we have only scratched the surface of gaming's training potential.

Straws in the Wind

The Export-Import Bank of Washington has authorized a $13 million credit to Marinduque Iron Mines Agents Inc., Manila, to cover costs of U. S. equipment for an integrated copper and zinc extracting and fabricating plant in the Philippines . . . General Motors Corp. distributed more than $11 million in common stock, government bonds, and cash to 54,000 salaried employees who participated in the firm's savings program last year.

Metalworking Pulse

The Business Trend: STEEL's industrial production index dipped 2 points in the week ended Jan. 28 to a preliminary 146 (1947-49=100). Declines in steelmaking and output of electricity (seasonal) caused the dip. **Autos:** Schedules are being trimmed further as sales continue to slide. Bad weather is blamed for the falloff in January. **Steel:** Estimated ingot output for the week ended Feb. 4 is down 1.2 per cent from a week earlier.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Jan. 28 .... 146†
  Year ago 184
  Details on Page 57

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Feb. 4 .. 90,000*
  Year ago 164,027
  Details on Page 54

- **STEEL INGOT OUTPUT (TONS)**
  Week ended Feb. 4 1,448,000*
  Week ago 1,466,000
  Details on Page 104

†Preliminary. *Estimated.

NOW... THE LONGEST SEAMLESS STEEL TUBING IN THE INDUSTRY!

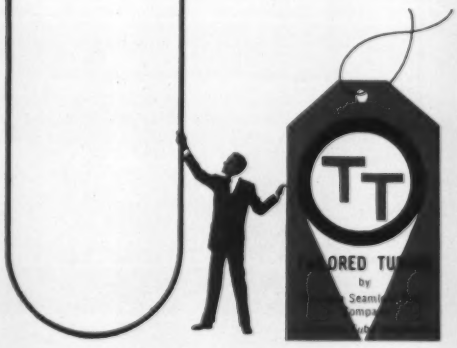
New facilities at our plants in South Lyon, Michigan, and Rosenberg, Texas, are now producing the longest seamless steel tubing in the industry—in lengths of 85 feet or more, for use in feedwater heaters, in nuclear power plants, wherever high-pressure application is required.

Michigan Seamless alloy and carbon steel tubing, TAILORED TO THE JOB, has proven advantages over non-ferrous tubing. For example, in high-pressure feedwater heaters, steel tubing eliminates costly shutdowns due to copper deposit in the boiler or on turbine blades. Operating data from plants now using steel tubing in feedwater heaters, shows that corrosion is negligible even when intermittent on-line time is necessary. And the first cost of a heat exchanger tubed with steel is at least 20 percent less than one tubed with non-ferrous!

For information on how steel tubing can improve your feedwater heater design, write or wire Michigan Seamless Tube Company, 402 West Street, South Lyon, Michigan.

U-TUBES

Order from one source: Long tubing, TAILORED to your specifications and U-bent to fit your design, shipped on pallets, ready for installation.



Steel

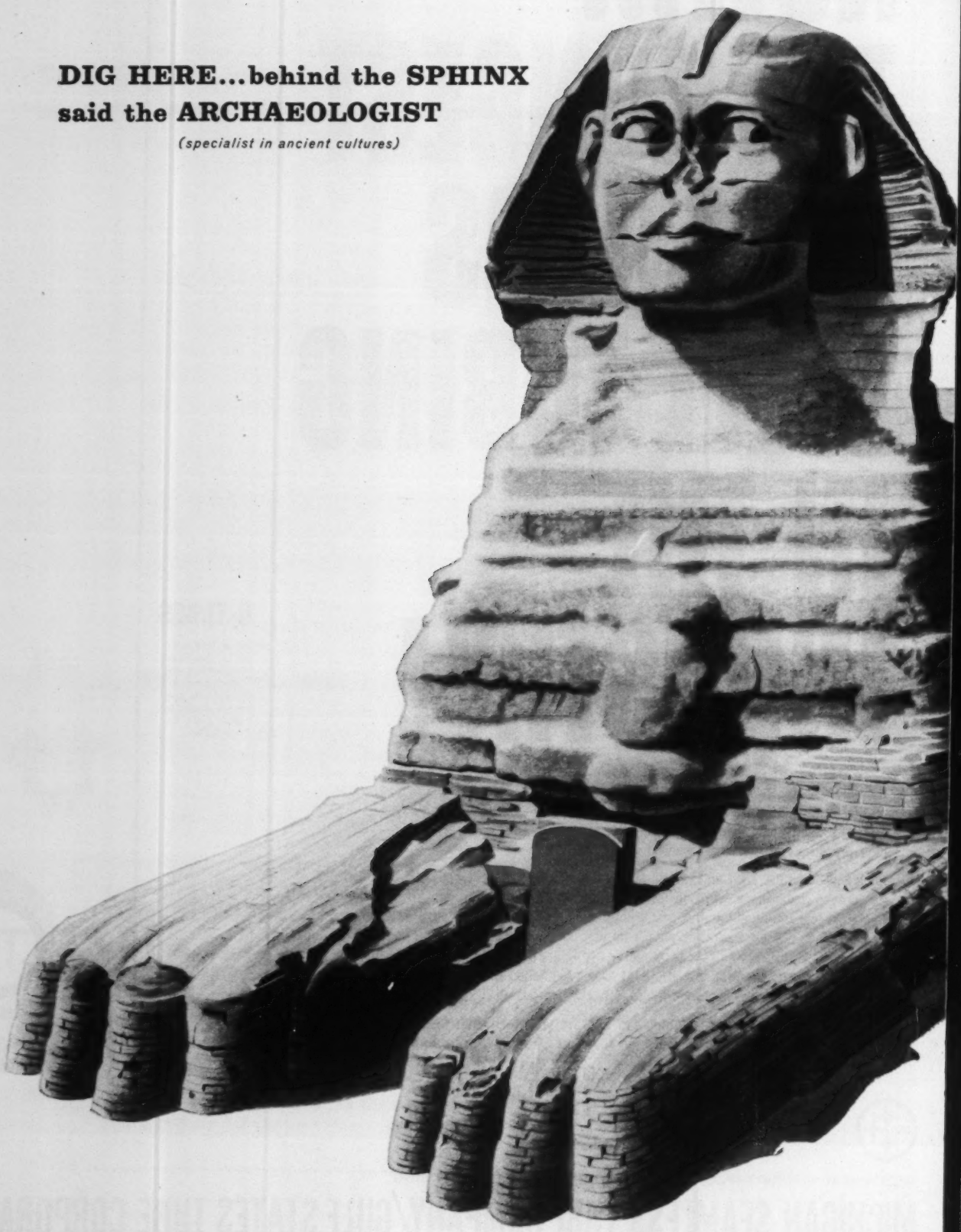
MECHANICAL, AIRCRAFT, PLAIN AND FINNED HEAT EXCHANGER TUBING

MICHIGAN SEAMLESS TUBE COMPANY/GULF STATES TUBE CORPORATION

SOUTH LYON, MICHIGAN ROSENBERG, TEXAS

DIG HERE...behind the SPHINX
said the ARCHAEOLOGIST

(specialist in ancient cultures)



Flip a switch...Weld AC or DC said the man from LINCOLN

(specialist in arc welding)

FROM the look on the Sphinx' face, we'd say the Archaeologist is about to hit pay dirt . . . and why not? Knowing where to dig is his specialty.

And, incidentally, knowing where to dig to solve welding production problems is a specialty of LINCOLN Field Engineers. And that pays off for his customers!

Take the typical problem which existed in a Pennsylvania plant producing engines and compressors. The LINCOLN Field Engineer was in the shop on an electrode application. He noticed that the operators were constantly moving from AC welders to DC welders . . . and then moving back again. This continual changing was required in order to use the proper electrode for each of the many types of jobs . . . varying from fabricated bases to pressure piping, and from short runs to production jobs.

The LINCOLN man recommended installing "IDEALARC TM" AC/DC welders which produce either AC or DC current. The operator has merely to flip a switch on the machine to change currents. The plant superintendent was skeptical, but authorized putting in two "IDEALARCS".

Results were gratifying. Immediately, management was able to schedule any type production to these machines. The operators could weld with AC—flip a switch—and in an instant be welding with DC. Both production and morale soared. Soon, five additional "IDEALARC TM's" were installed and the production problem was solved.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

THE LINCOLN ELECTRIC COMPANY

Dept. 2921 • Cleveland 17, Ohio

LINCOLN WELDERS

How's this for high-speed hobbing?

WORK PIECE					HOB (1 start)				Pieces per Load	Method*	Time per Piece	Pieces per Grind	Cut
Dia. Pitch	No. of Teeth	Helix Angle	Face Width	Material	Dia.	RPM	Feet PM	Feed					
10	20	15°	1¾"	1040 leaded	3"	500	395	.055"	1	A	2 min. 25 sec.	150	Finish
7	23	13°	¾"	8620	4"	350	370	.100"	2	A and B	59 sec.	240	Pre-shave
5	43	24°	1⅝"	8620	4"	280	300	.100"	2	B	3 min. 45 sec.	80	Pre-shave

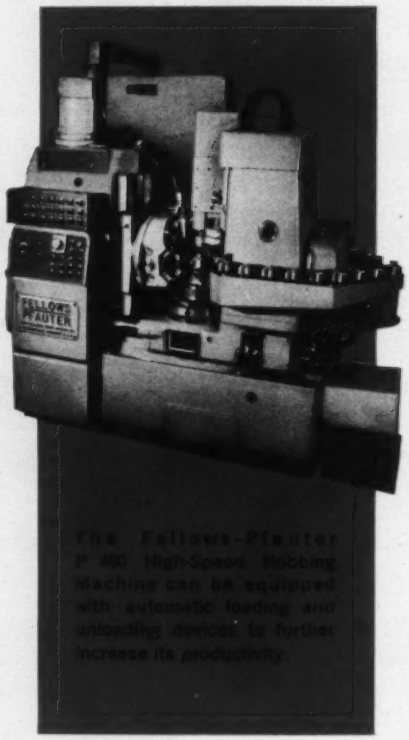
** Method A: Diagonal Hobbing. Method B: Step-by-step Hobbing.*

The chart shows the cost-cutting, high-production performance you get with the Fellows-Pfauter P 400 High-Speed Hobbing Machine. And here are some advanced design features that make it possible:

It's Easy & Fast to Handle. Work area is easily accessible for setup and loading • Automatic retraction of table from hob facilitates work changes • Pushbutton hob shifting • Built-in hydraulics for operation of tailstock and fixtures • Provides infinitely variable speeds and feeds.

It's Rigid and Rugged for High Production. Heavy, rugged hob head • Double wall construction column and bed, with heavy V-ways • Table as large as maximum work piece diameter • Index worm gear nearly as large as work table • Work support column of massive construction.

Saves time, floor space and production costs. Get complete details on the Fellows-Pfauter P 400 High-Speed Hobbing Machine.



The Fellows-Pfauter P 400 High-Speed Hobbing Machine can be equipped with automatic loading and unloading devices to further increase its productivity.

THE FELLOWS GEAR SHAPER COMPANY • 78 River Street, Springfield, Vermont, U. S. A.

Branch Offices: 1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Ave., Chicago 39, Ill.
6214 West Manchester Ave., Los Angeles 45, Calif.

THE PRECISION LINE

Fellows

Gear Production Equipment

Although Jeffrey patented the principle years ago, STR (Steel Thimble Roller) chain has been constantly improved by Jeffrey to keep pace with industrial progress. Components are designed, materials selected, machined and heat treated to give maximum strength, shock resistance and wearability with minimum weight.

Jeffrey STR chain provides a positive yet flexible means of transmitting power for unit machinery and general industrial drives, and for heavy duty elevating and conveying service. Jeffrey offers four classes to meet various operating conditions.

Ask for engineering assistance on the application of STR chain to suit your needs. The various classes of STR chain are in stock, ready for immediate shipment to you. Chain also can be tailor-made to fit your particular requirements. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

See your Jeffrey distributor for your chain requirements

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY... CONTRACT MANUFACTURING

You get these benefits...

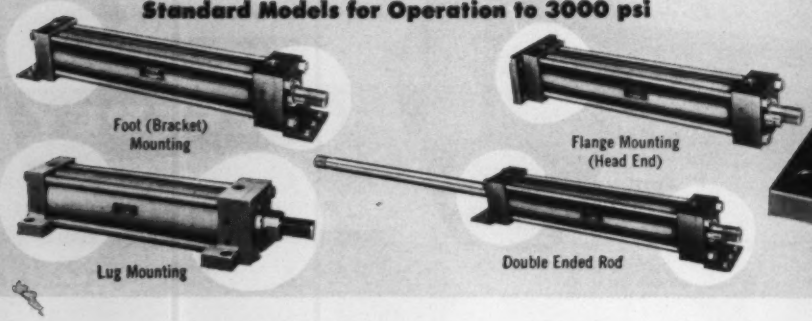
* **prompt delivery**
* **competitive pricing**
* **any external mounting to meet your requirements**

When you BUY

VICKERS HYDRAULIC CYLINDERS

Typical of custom designs that can be furnished readily from Vickers new cylinder facility is this model built with extra rigidity and strength at both rod and clevis ends to overcome side loadings. For added corrosion resistance, stainless steel clevis pins, piston rods, retaining screws and grease fittings are used.

Standard Models for Operation to 3000 psi



Choose the cylinder "outside" that's best for your installation—Vickers offers you a wide selection of standard mountings plus an almost unlimited range of special configurations. Alternate rod end threads . . . straight thread port connections . . . extra barrel lengths for bearing support . . . are among many available options.

- Working pressures to 3000 psi (non-shock)
- Hard chrome plated, ground and polished, high-strength alloy steel piston rods.
- Large ports hold pressure drop within desirable limits.
- Fast, accurate parts replacement is assured because all cylinders are individually registered.
- Honed barrels of heavy walled seamless tubing minimize friction and wear.
- Cushions can be provided—either head, rod or both ends.
- Your choice of automotive step-cut piston rings for maximum life or low friction "T" rings for applications requiring minimum leakage. Full size cast iron piston for maximum bearing support with either type seal.
- Synthetic rubber wiper ring is standard—metallic wipers available.
- Two large wrench flats on rod are standard—additional flats available on request.
- Fully meet JIC specifications.

New, separate plant facilities—devoted exclusively to the design and manufacture of hydraulic cylinders—assure prompt individual attention to your orders. Service stocks are maintained at all Vickers warehouses in the U.S. and Canada. For more application data and installation dimensions, call or write today for Bulletin 60-68

VICKERS INCORPORATED

DIVISION OF SPERRY RAND CORPORATION

Machinery Hydraulics Division

ADMINISTRATIVE and ENGINEERING CENTER

Department 1536 • Detroit 32, Michigan

FOR PROMPT SERVICE CALL:

DETROIT TOwnsend 8-0272	**CINCINNATI** MAin 1-1756	**INDIANAPOLIS** CLifford 3-3535	**PHILADELPHIA (Area)** LOwell 6-7900	**SAN FRANCISCO (Area)** ATlantic 4-7106
ATLANTA TRinity 4-0187 2-0837	**CLEVELAND** EVergreen 2-3366	**LOS ANGELES (Area)** ORegon 8-2503	**PITTSBURGH (Area)** LOcust 1-3504	**SEATTLE** MUtual 2-6950
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CHICAGO (Area) POrter 6-2900	**HOUSTON** JAckson 2-9623	**NEW YORK (Area)** DRexel 6-3500	**ROCKFORD** WOodland 2-0615	**WORCESTER** SWift 8-3706

8903

Standard Models for Operation to 3000 psi

NEW HUGHES MT-3
AUTOMATES JOB LOT PRODUCTION

The new Hughes MT-3 replaces from three to six conventional machines. It drastically reduces costs by bringing production line efficiency to small lot manufacturing of parts requiring face and other milling operations, drilling, boring, reaming and tapping. Operating from numerical instructions programmed on tape, the system functions completely automatically. The MT-3 has an absolute positioning accuracy of ±0.0005". Its part size envelope is a twelve-inch cube, but in many cases will machine parts up to 12" x 24" x 24".

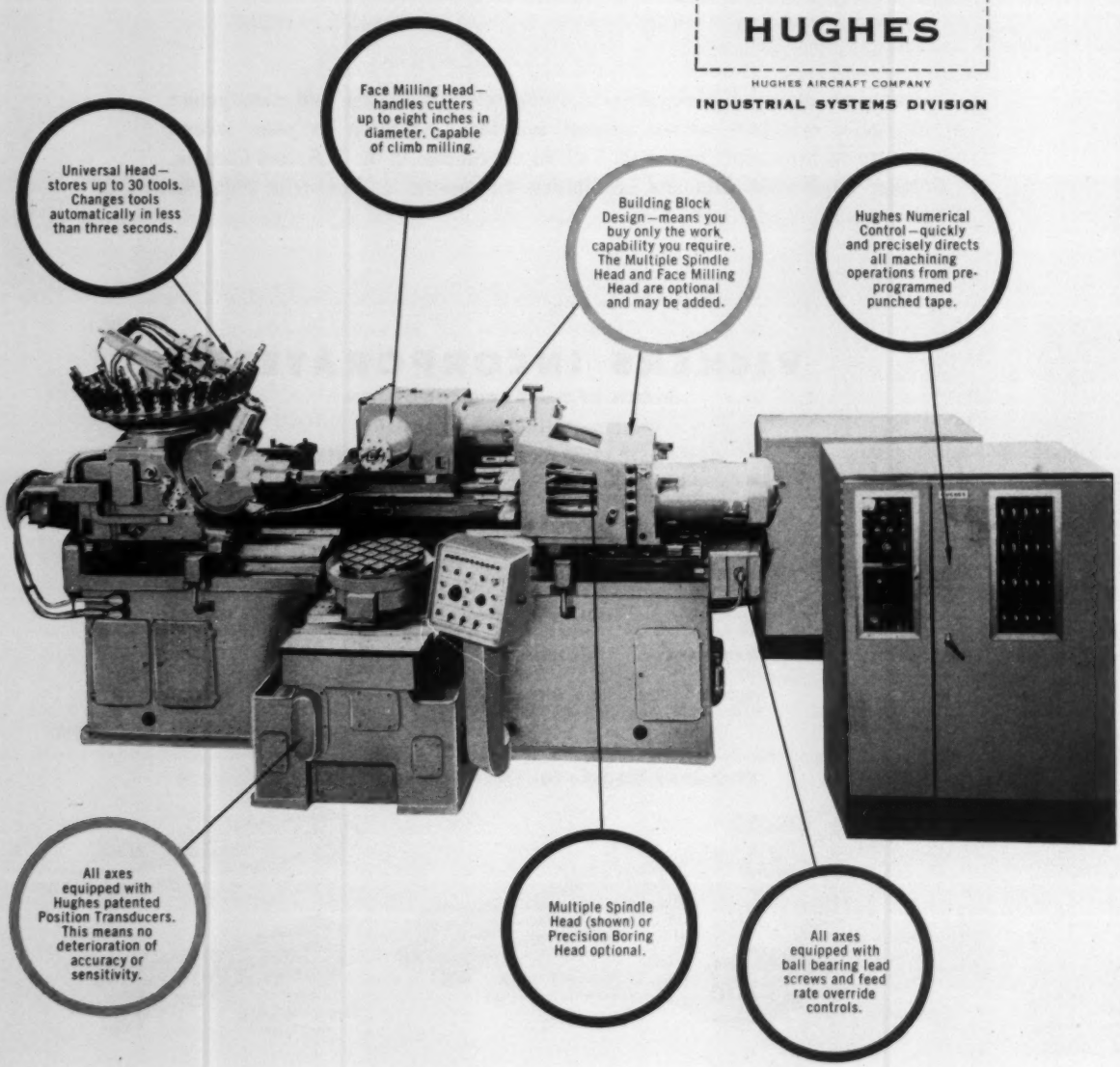
For complete engineering specifications, firm price and delivery dates write, teletype (TWX INGL 4117) or call direct: HUGHES INDUSTRIAL SYSTEMS DIVISION, P. O. Box 90904, Los Angeles 45, California.

CREATING A NEW WORLD WITH ELECTRONICS

HUGHES

HUGHES AIRCRAFT COMPANY

INDUSTRIAL SYSTEMS DIVISION


Universal Head—stores up to 30 tools. Changes tools automatically in less than three seconds.
Face Milling Head—handles cutters up to eight inches in diameter. Capable of climb milling.
Building Block Design—means you buy only the work capability you require. The Multiple Spindle Head and Face Milling Head are optional and may be added.
Hughes Numerical Control—quickly and precisely directs all machining operations from pre-programmed punched tape.
All axes equipped with Hughes patented Position Transducers. This means no deterioration of accuracy or sensitivity.
Multiple Spindle Head (shown) or Precision Boring Head optional.
All axes equipped with ball bearing lead screws and feed rate override controls.

Quality in Ascendancy

The superiority of the vast number of products that are — and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel . . . you get it when you buy Roebling.

For information on how our products can help yours, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

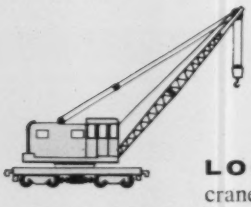
Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

crawlers . . . rubber . . . rails . . . which will give you lowest-cost yard handling?

CRAWLER cranes give you high flotation and stability for working in unimproved yard areas . . . make spot turns for maneuvering in cramped quarters. Interchangeable attachments for magnet, clamshell, grapple, or hook work. Capacities 12½ to 110 tons.

RUBBER-MOUNTED cranes travel and work anywhere around your plant . . . inside-outside of buildings . . . make cross-town trips to warehouses, docks, or other plant sites. Available in truck-mounted, or self-propelled (one-man-operated) types. Capacities to 60 tons.



LOCOMOTIVE cranes offer the advantage of doubling on both materials-handling and car spotting duty. Owner cost records show that AMERICAN DiesELectric® locomotive cranes *can write off their cost completely in 5 years.* Capacities to 80 tons and up. Diesel or DiesELectric power.

ARE YOU SURE your plant is using the lowest-cost method of yard materials-handling? Ask us! As the *only* manufacturer offering a complete choice of crawler, rubber-mounted, and locomotive cranes, we are in a unique position to help analyze your needs . . . and make unbiased recommendations. CC-712

AMERICAN

AMERICAN HOIST
and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

The nearsighted MISTER MAGOO says . . .
"1938? What magnificent memories. I gave that boy Corrigan his navigating instructions, and General Electric invented the reflector lamp. Happy birthday, G-E Reflector Lamps! Blast this carafe! How do they expect a man to get a cup of coffee?"

General Electric Reflector Lamps laugh off dirt and dust— send more light where it's needed

Now you can cut maintenance costs—*and get more light overnight*—without spending a penny for new lighting equipment or increasing your power costs.

How? Switch to General Electric Reflector Lamps in your filament or mercury lamp systems.

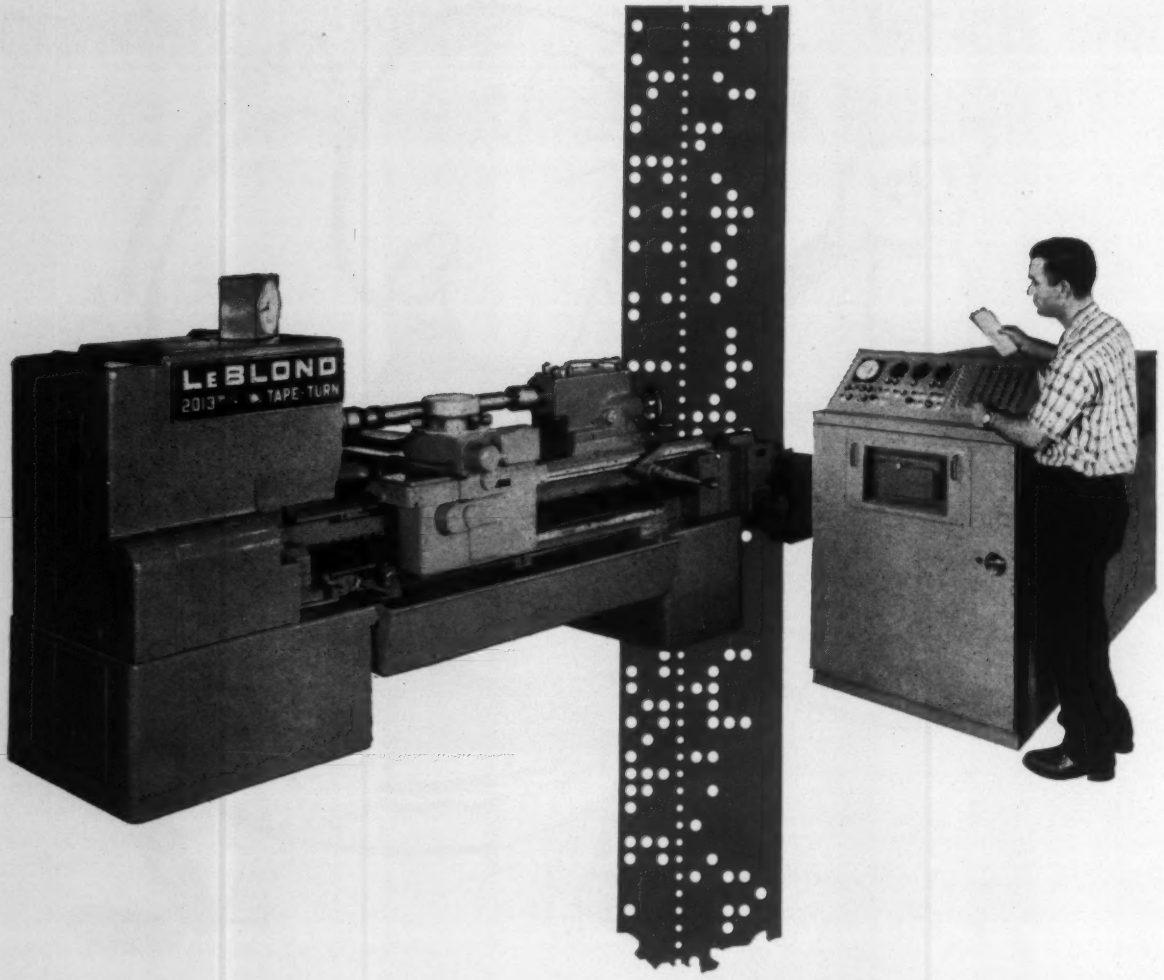
A pure silver reflector (or phosphor in mercury lamps) is sealed inside a specially shaped bulb where it can't get dirty. It directs more light *down* on the job—day in, day out. You get all the light you pay for. Everybody gets more light, can do better work faster.

Maintenance men seldom, if ever, have to clean fixtures. All they do is change burnouts—and the long, uniform life of G-E Lamps means changing can be done on a regular schedule.

General Electric *Filament* Reflector Lamps (developed in 1938) are available in 500-W, 750-W and 1000-W sizes with pure silver reflectors (above). G-E *Mercury* Reflector Lamps (1952) come in 400-W (silver or phosphor reflectors), and 1000-W (phosphor reflector) sizes. Your General Electric Lamp distributor can help you pick the best one for your business. Call him today. General Electric Co., Large Lamp Dept. C-12, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC



TURN WITH TAPE

Do it with TAPE TURN, the lathe that turns contours by numerical control; and tapers, sharp angles, radii, facing cuts and plunge cuts besides, not to mention heavy duty straight turning. No need for handwheels and levers. This lathe takes orders remotely from standard 1" 8-channel punched tape or a convenient pushbutton keyboard.

Tape-Turn puts engineering specifications at the cutting edge. Production Control can maintain control. Command by General Electric's new Mark Century numerical control. Full zero offset. Manual overrides at the console.

Turn contoured parts like this with tape and cut costs up to 75 per cent over tracer turning. Full range of spindle speeds and horsepower, all the beef you need for heavy production turning with LeBlond Tape-Turn models in several sizes. Write for documented savings with Tape-Turn, or ask your LeBlond representative for the Tape-Turn bulletin.

LEBLOND of Cincinnati

THE R. K. LEBLOND MACHINE TOOL CO. *World's Largest Builder of a Complete Line of Lathes* MADISON AT EDWARDS ROADS, CINCINNATI 8, OHIO

Engineering Can Be Paid!

The movement to alleviate the problem of free engineering is gaining further momentum.

As reported here on Jan. 9, Brown & Sharpe Mfg. Co. announced that customers will be billed a nominal charge of $15 for each engineering proposal.

As a result, a score of companies tell us they are considering the application of Brown & Sharpe's policy.

In addition, one group of industrial equipment builders is studying plans for establishing an ethical and uniform industry-wide practice. Plans call for an engineering proposal charge based on a small percentage (3 to 5 per cent) of the estimated cost of the equipment.

At 5 per cent, the fee for each bidder on a $10,000 job would be $500.

Such a fee, it is contended, would make the customer more cautious in selecting bidders. Among the benefits to him would be better engineering and fees that would be tax deductible because they are separated from the cost of the equipment.

Further, he would not be required to pay indirectly for proposals given free of charge to other prospective customers.

We commend such bold steps toward the elimination of excessive engineering costs.

However, we think the industry-wide approach would be the most effective.

From the investigations made so far, it seems apparent that the objectives can be accomplished through the establishment of trade practices without getting into the area of collusive pricing.

Whether you are a supplier or a customer, we hope you will help convert engineering costs from "free" to paid.

Remember they are never "free."

Irwin H. Such

EDITOR-IN-CHIEF

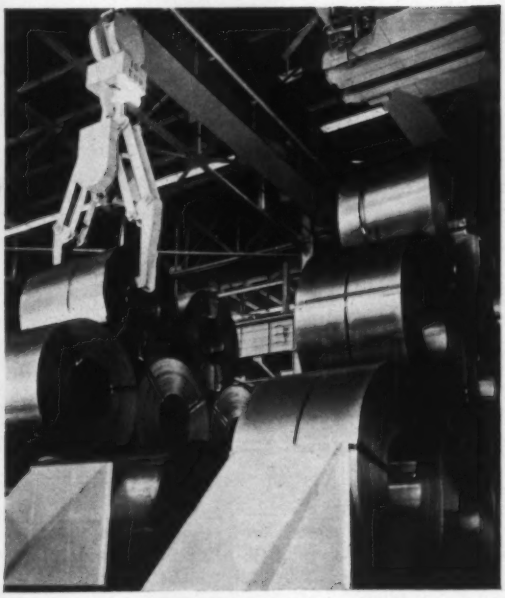
New steels are born at Armco

Steel

This mark tells customers you use sturdy, dependable steel

First the part... *Then* the Armco Steel

Armco metallurgists **start** with study of the part—then tailor hot-rolled and cold-rolled steels to exact needs



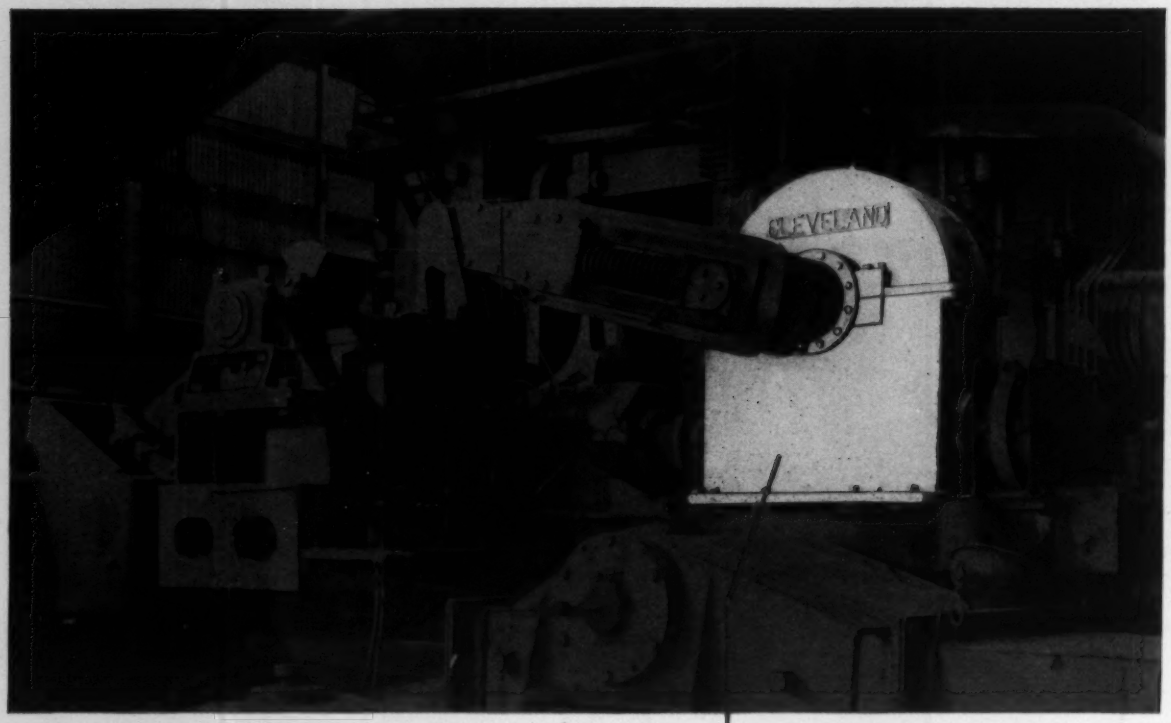
How is the part designed? What's its function? What kind of service does it face? How and on what equipment is it made?

These are a few of the questions Armco metallurgists ask before a pound of steel is made for a customer's new product or part. The sum total of the answers forms a pattern that is translated into a production "routing"—the step-by-step program under which Armco Hot-Rolled and Cold-Rolled Steels are made and processed to meet specific fabrication and service needs. But the metallurgists don't stop there. Once a routing is approved, they double-check each succeeding order to make sure there's no deviation.

Performance records in hundreds of metalworking plants testify to the results. Armco Hot-Rolled and Cold-Rolled Steels not only show high performance, but *consistent, predictable* performance, from sheet to sheet and order to order. In fact, in many plants these Armco steels are looked upon as "standards of high quality."

Price, delivery and technical information on these hot-rolled and cold-rolled steels are quickly available from your nearby Armco Sales Office or by writing Armco Division, Armco Steel Corporation, 1141 Curtis Street, Middletown, Ohio.

ARMCO **Armco Division**

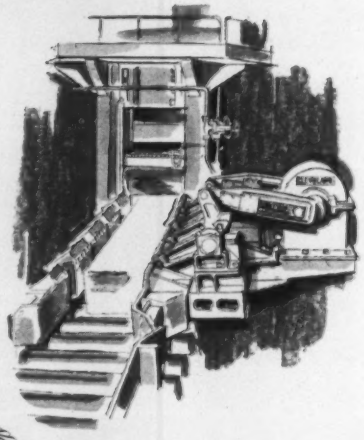


Two Cleveland Speed Reducers drive "Magic Fingers" on Kaiser Steel's New Slabbing Mill

Here's one of two rugged 3000-AT Cleveland Worm Gear Speed Reducers busy at work driving the manipulator finger lift mechanism on Kaiser Steel Company's new 45 x 90-inch Universal Slabbing Mill at Fontana, California. With these Cleveland Reducers, mounted on the slab pusher, turning massive slabs between mill passes is a simple, rapid operation.

In these large, yet compact, space-saving Clevelands, worm and gear shaft bearings are supported by a massive internal structural framework that enables the units to withstand extreme shock loads. Their right angle shaft arrangement provides a distinct advantage over other forms of gearing that might not fit the space limitations of a specific installation.

In all types of industrial plants, wherever rugged, compact and dependable speed reducers are needed, Clevelands handle the toughest assignments. Call your Cleveland Representative today, or write for Bulletins 145 and 410-A to get complete information on how to handle your most demanding power transmission jobs.



Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

CLEVELAND
Worm Gear
Speed Reducers

Within the next week, the President will ask Congress to enact "tax incentives for sound plant investment."

2 Step Depreciation Reform Coming

PRESIDENT KENNEDY will use depreciation reform as one of his methods to stimulate business.

Within the next week, he'll present a program for temporary relief to Congress. And it's reported that Secretary of the Treasury Douglas Dillon will have a program for long term reform ready by Apr. 1.

Step One

In his State of the Union Message last week, the President didn't spell out what he would ask for in the short term, except to say he wanted "tax incentives for sound plant investment." One indication of the approach he may favor is contained in a tax analysis prepared by Prof. Stanley Surrey of Harvard.

The report recommends that business be granted a special deduction from its income tax bill if its investment in new plant and equipment is more than its depreciation deduction during the year. A tax credit would apply to 80 per cent, say, of that investment above the "normal" depreciation. The benefit would be in force for a limited time —one year, perhaps—or on executive order.

Tax experts queried by STEEL urged industry to support such a plan. While they had doubts about administrative problems it would bring, they all believed it would deliver "quite a kick" to the economy.

Step Two

Look for a permanent reform plan to be presented in April. Nobody knows what form it will take. One possible approach would be merely to change a few words in Section 179 of the Internal Revenue Code.

The section, made law in 1958, allows a taxpayer to write off 20 per cent of the cost of depreciable property if the deduction is taken in the year of acquisition and the cost of the property does not exceed $10,000. The reform would remove or raise the $10,000 ceiling.

Rep. Wright Patman (D., Tex.) has already introduced H.R. 3564 which would raise the ceiling to $500,000, but it would apply only to property acquired in 1961 or 1962.

Under the present law, if you purchase equipment at a cost of $10,000 and choose to apply Section 179, you get a first year depreciation of $2000, plus the allowance normally allowed (computed on an $8000 basis). If the cost exceeds $10,000 in a tax year, you may elect items to depreciate on the high, first-year writeoff up to $10,000. The limit is doubled in the case of a husband and wife filing a joint return.

Legislators Busy

Several senators and representatives have already introduced bills which the Congress may prefer over White House recommendations.

One of the most interesting is S. 580, put into the hopper by Sen. George Smathers (D., Fla.). Watch for a companion measure to be introduced in the House soon. It would allow a taxpayer to select any period of depreciation, so long as it is not less than five years on

new machinery and equipment purchased after Dec. 31, 1960. The minimum period is three years on used equipment (at least two years old). Real estate is excluded. Salvage value would remain the same as if normal depreciation had been used. The gain from the part of the asset rapidly written off would be treated as ordinary income. The balance would be capital gain. For example:

1. Assume the purchase price of a machine is $10,000.
2. Assume a normal life of ten years and no salvage value.
3. You depreciate the asset over five years.
4. You sell it after five years for $6000.
5. Because you have fully depreciated the asset, the $6000 is profit, taxed this way: $1000 is treated as a capital gain because under normal writeoff rates $5000 of the asset would still be undepreciated; $5000 is treated as ordinary income because the profit comes as a result of the fast amortization.

Another measure (H.R. 422) has already been introduced by Rep. Eugene Keogh (D., N. Y.). It advocates reinvestment depreciation: When a property is retired, you can deduct the difference between its value in current dollars and its cost at the time it was acquired. The amount, added to what was already written off, will compensate for the decline in the value of the dollar. The deduction would be allowed only to the extent that an equivalent investment is made within two years of retirement. The amount written off in the first year would be deducted from the depreciable basis of the new property.

Several other bills have been or will be introduced. Rep. Frank Ikard (D., Tex.) and Rep. Thomas Curtis (R., Mo.) have identical measures authorizing a deduction from taxable net income of an amount equal to the aggregate addition to capital represented by reinvestment in depreciable assets, inventory, and accounts receivable. Maximum deduction would be 20 per cent of net income or $30,000, whichever is less.

Will Congress Act?

The outlook for reform is the best it has been in years, and the chance for speedy action is good, particularly since the President said he favored such a move in his State of the Union Message (for other points he covered, see Page 44).

Congress is generally in favor of reform. Rep. Wilbur Mills (D., Ark.), chairman of the tax writing Ways & Means Committee, has gone on record for the action. Sen. Harry Byrd (D., Va.), chairman of the Senate Finance Committee, probably is not so enthusiastic.

One observer sums up the situation this way: "While we still must persuade a few legislators like Senator Byrd, I believe reform will be enacted in 1961."

Du Pont Unveils New Vacuum Arc Furnace

A NEW, consumable electrode, vacuum arc furnace that is said to offer improved efficiency has been developed by E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. The secret: An extremely sensitive control system.

The firm described its furnace Feb. 3 at the winter meeting of the American Institute of Electrical Engineers in New York. Du Pont feels it may have widespread application in the basic, vacuum metals refining industries.

• **Electrode Control**—The motion of the electrode is hydraulically operated. Response time of the system to electrical variations is said to be less than 3 milliseconds.

In melting and refining reactive metals like titanium, tungsten, or columbium, arc size (which is critical to furnace efficiency) is controlled by measuring voltage changes.

The Du Pont system has a voltage sensitivity of plus or minus ¼ volt. The hydraulic equipment is based on a "jet-pipe" principle developed by Askania Regulator Co., Chicago. It adjusts the electrode to correct voltage variations and arc length.

Controls are operated by one person from a central console. Electronic amplification is not needed. A small number of moving parts is said to make the system simple to operate and easy to maintain.

Remington Cancels Move to Europe

PRODUCTION of standard, nonelectric typewriters will not be shifted from the Elmira, N. Y., plant of Remington Rand Div., Sperry Rand Corp., to the company's European plants as announced last September.

• **Why the Switch?**—"Since September, the business recession in the U. S. has taken on more serious implications," said Dause L. Bibby, Remington Rand president, in a letter to employees. "While we are confident that general recovery is imminent, we want to do nothing that would in any way aggravate the situation, particularly as it might affect the welfare of our employees and the Elmira community."

Growing concern over the gold situation and the unfavorable U. S. balance of payments was another factor. "This company has no desire to contribute in even a small way to these problems by shifting production of standard typewriters from this country to Europe," stated Mr. Bibby.

• **How It Started**—The move was originally planned to counter domestic and overseas competition from low priced, foreign made typewriters. Location of manufacturing facilities closer to the growing European market for standard typewriters was also a major objective. The demand for such typewriters in the U. S. declined 38 per cent between 1950 and 1959 while electric typewriter purchases jumped 284 per cent.

About 700 employees (20 per cent of the Elmira plant work force) are engaged in standard typewriter production.

Personnel Programs Need Flexibility

FLEXIBILITY is the main cog in gearing personnel plans and programs to company needs, said Dr. George S. Odiorne, director, Bureau of Industrial Relations, University of Michigan, in a speech before the Northern Ohio Personnel & Executive Conference in Cleveland. Dr. Odiorne observed that personnel managers must be sensitive to new directions within their companies so they could deploy their staffs to fulfill or anticipate new corporate goals.

Profit planning, company growth, cost reduction, and organization changes were among the forces which he cited as demanding flexibility of organization, staff, and programs within personnel departments.

• **Profit Planning**—One consumer products company, said Dr. Odiorne, developed a profit plan based largely on capturing a greater share of the market through intensive marketing and sales efforts. The personnel manager immediately researched requirements and shaped up a hard hitting, sales training program. The fact that sales expanded greatly was credited in part to the practical training provided through the personnel department's initiative.

"Several other training plans which had been contemplated, including supervisory training in the plant, were shelved until the primary target was in hand," noted the professor. "Later, as pressure shifted from sales to production, the supervisory training program was ready and used."

• **Ups and Downs**—The sophisticated personnel man has a battle plan for reacting rapidly to swings in the business cycle, said Dr. Odiorne. Answers to two questions should always be on tap: 1. If the personnel administration budget were increased by 25 per cent, where would the money be used to insure growth, stability, and profitability? 2. If the budget were cut 25 per cent, what functions could be eliminated with minimum repercussions?

• **Company Growth**—Dr. Odiorne suggested that if personnel men were sufficiently "nosy," and kept posted on the major business strategies of managements, they could convert upcoming changes into opportunities for service and contribution by personnel departments. In one company, when the board authorized a large research facility, the corporate personnel director conferred with the research director about manpower needs. They decided that the lab's personnel supervisor would need training in recruiting top level scientists. The deficiency was cared for by training the man in executive recruiting until he was ready for the job.

There was the case of the less aggressive personnel man who alibied: "I think it would be out of place for me to go poking into top management matters looking for work . . ." Yet, here's what the company president told him during his appraisal interview: "While you do a good job over in personnel, you aren't on the management team unless you show . . . initiative (and act) . . . to move the whole show upward a notch . . ."

A PLASTIC EXHAUST MANIFOLD for the removal of corrosive fumes from zinc and tin plating lines is assembled at an Ohio based steel company. The 125 ft manifold, made of material supplied by Seiberling Rubber Co., Akron, ranges in diameter from 22 in.

• **Cost Reduction**—If sales are up and profits are down, the alert personnel manager knows that the big problem will be cost reduction. One personnel administrator met the situation by going to the president with plans for cutting personnel costs. As a result, the personnel department discovered several examples of topheavy supervision in some departments. The savings: Six figures a year in salary dollars. Careful checks on benefits, salary administration, and hiring added to the savings.

• **Organization Changes**—Dr. Odiorne said decentralization made significant changes in the relationships among corporate, division, and plant staffs. He cited the case of the large firm which decentralized its organization into major product divisions. From centralized training, salary administration, and negotiations, the personnel department began a gradual but steady shift of the responsibilities to each of the divisions and major staff departments. When the move was completed, the central staff became principally concerned with research, advisory, and coordinating functions. Prior study and definition of the new relationships prevented warping of the total personnel program, and prevented undue disruption of vital services during the transition.

• **The Warning**—Dr. Odiorne cautioned: "The idea that personnel departments are organized and staffed in rigid postures which conform to the textbook model is a dangerous one. It is defensible only where the company itself is static and unchanging."

"Because of its increasing size, the teenage group is assuming unusual importance to the manufacturer."

—**EUGENE GILBERT**, President, Eugene Gilbert & Co.

Population Group	July 1, 1959	Apr. 1, 1950 (In millions)	% Increase
Under 5	19.8	16.2	22.2%
5-9	18.7	13.2	41.6%
10-14	16.4	11.1	47.7%
15-19	13.0	10.7	21.5%
All U. S. age groups	177.1	151.1	17.2%

Source: Bureau of the Census.

Minors Make a Major Market

CHILDREN UNDER 20 make up a booming market you can't afford to overlook.

It's growing like "a tidal wave," in the opinion of Eugene Gilbert, president, Eugene Gilbert & Co., New York, a youth market research organization. "It's a market which implies new ideas, a desire and willingness for change and progress, and an addiction to unique habits."

Size is one key factor: This age group is growing faster than the population as a whole (see table above). Our population growth is like an accordion: It's high at the ends (the under 20 group and senior citizens) and sags at the middle. (The young adult group—25 to 39—is shrinking.)

Another key factor: This is our richest population group in terms of spending power, says Mr. Gilbert. Teenagers receive more than $9 billion annually in allowances and earnings, and they spend it as they see fit—unlike mom and dad who have most of their available funds committed.

• **Depth**—The market has depth. Teenagers are maturing faster than they used to. More than a million are married (18 is the peak age for women to marry). Mothers 20 and under account for a third of the "first born." So many of these people are in the market for "adult" goods—such as household appliances, furnishings, and kitchen utensils.

The kids who aren't married are also big buyers. Girls spend over $300 million annually on cosmetics (often in metal containers). They buy hope chest items, soft drinks (more and more are coming in cans), and small appliances such as hair dryers, record players (owned by more than 70 per cent), radios, and clocks.

The boys buy such things as sporting goods, do-it-yourself gadgets, and hobby equipment. They spend a fortune on autos—more than $200 million annually, including gas.

The kids are saying more about family buying decisions too. A recent survey showed 55 per cent of the girls queried claimed some credit for their families' choice of cars. And brand loyalties formed in the teen years frequently stick through adulthood.

• **Tots Trigger Toy Boom**—Don't forget the subteens and toddlers. While they may not directly buy much beyond the candy counter, they share in forming the wants of the leisure market. And parents insist on giving them "what we didn't have."

The Toy Information Bureau, New York, reveals parents bought $1.7 billion worth of toys for their youngsters last year, a 7 per cent boost over the record set in '59. The bureau sees a continuing upward trend in toy outlays. Reasons: The growing population, a wider selection of toys, and the move to suburban outdoor living. Another bright note: While 85 per cent of the toy sales used to be at Christmas, the figure has fallen to 60 per cent in recent years, pointing to less seasonal sales.

An analysis of cost data compiled

by Ernst & Ernst, a Cleveland accounting firm, indicates that "materials used" make up 41 per cent of the total net toy sales and 56 per cent of the factory cost of goods sold. And the 1400 or so toymakers offer a good market for machinery as well as raw materials. Employment in the industry has not increased as rapidly as the dollar volume of sales because of trends toward automation.

• **For Many Lines** — The largest single items manufactured by the industry include toy trains, ships, mechanical toys, structural toy sets, doll carriages, and carts. Vehicles, such as bicycles, velocipedes, scooters, autos, and wagons are important. Guns, skates, playground equipment, and other sporting goods are other major industry products. While plastics are taking an increasingly larger share of the raw material market for toys, metals are still significant.

Heath Co., Benton Harbor, Mich., is a good example of a firm which has adapted a standard industrial or consumer product to the toy and hobby market. Its hi-fi component kits appeal to adults and bright youngsters.

Producers of other products that consume large quantities of metal, such as band instruments, find sales prospects in most youth groups. An estimated 375,000 to 400,000 wind instruments, valued at $80 million, are sold each year in the U. S. Major manufacturers expect a continued market expansion of 3 to 5 per cent a year.

• **How to Crack It**—Mr. Gilbert suggests several points to build brand loyalty in the formative years:

"Use young people to build up the image of the manufacturer's brand. Promote in the schools through student representatives. Have teenagers act as advisers. Set up advisory panels. Teenagers like to feel manufacturers are interested in them.

"Recognize the vocal powers of the teen leaders. The sorority and class officers are terribly important. This pertains to a city as well as a small area.

"In promotion and advertising, get away from the 'mama' influence. Ads have to be aimed at teenagers themselves. The manufacturer can't play it safe and be everything to everybody."

Be honest! Don't try to fool them!

Another point: Don't try one pitch to sway all teenagers. Recognize the age differences and gear your promotions to each one. Example: Two-thirds of the teen age boys go into the armed forces. Hit them through camp newspapers.

• **Fads Important**—Remember, too, that children and teenagers are fad conscious. Example: Hoola hoops. And many such trends, particularly among college students, carry over into all markets. Ivy league clothing is a case in point.

Young folks are avid "bargain" hunters. Promotional tie-ins, gimmicks, samples, and contests go over big. But make sure your contests have lots of winners. Young people can be poor losers.

Image building is effective. Gen-

Do You Know the Youth Market?

(Answers to this multiple choice quiz are at the top of the next page.)

1. The total population of the U. S. will have increased or decreased _____ per cent between 1950 and 1965.
   −6% +10% +25% +42% +70%

2. The population of the 13 to 18 age group will have increased or decreased _____ per cent between 1950 and 1965.
   −6% +10% +25% +42% +70%

3. The young adult population (25 to 39) will have increased or decreased _____ per cent between 1950 and 1965.
   −6% +10% +25% +42% +70%

4. Teenagers now represent_____ per cent of the population.
   3% 5% 7% 10% 15%

5. The 19 and under group equals_____ per cent of the population.
   7% 10% 19% 28% 38%

6. Teenagers have allowances and earnings reaching_____ annually.
   $100 million $250 million $1 billion $5 billion $9 billion

7. Approximately_____ teenagers are married.
   25,000 100,000 250,000 500,000 1 million

8. The peak age for marriage of women in the U. S. is_____.
   18 20 21 23 25

9. One-third of the first children are born to mothers_____ and under.
   18 20 22 25 28

10. Retail toy sales totaled about_____ last year.
    $500,000 $900,000 $1.1 billion $1.4 billion $1.7 billion

11. Last fall,_____ students enrolled in U. S. colleges and universities.
    500,000 1 million 2.5 million 3.5 million 5 million

12. The number of students will increase_____ per cent by 1970.
    10% 25% 50% 75% 100%

Sources: 1-4, 6-9, Eugene Gilbert & Co.; 5, Bureau of the Census; 10, Toy Information Bureau; 11-12, Student Marketing Institute.

QUIZ ANSWERS

1. +25%	7. 1 million
2. +70%	8. 18
3. −6%	9. 20
4. 10%	10. $1.7 billion
5. 38%	11. 3.5 million
6. $9 billion	12. 100%

eral Motors sends a magazine to newly licensed drivers—their names are obtained from new registration lists. The soft sell is featured through driving tips and other motoring pointers. Ford Div., Ford Motor Co., has a teenage press conference to preview new models. Newspapers are asked to send teenagers to the conference with the paper's reporter. The kids write a story about the showing, and prizes are awarded for the best reports.

• **Collegians Differ**—Though they may still be teenagers, college students differ from teenagers in high school, warns Robert M. Stelzer, president, Student Marketing Institute, New York. They should not be approached in the same ways.

Sample pitfall: Over half of the college students rarely, if ever, watch television.

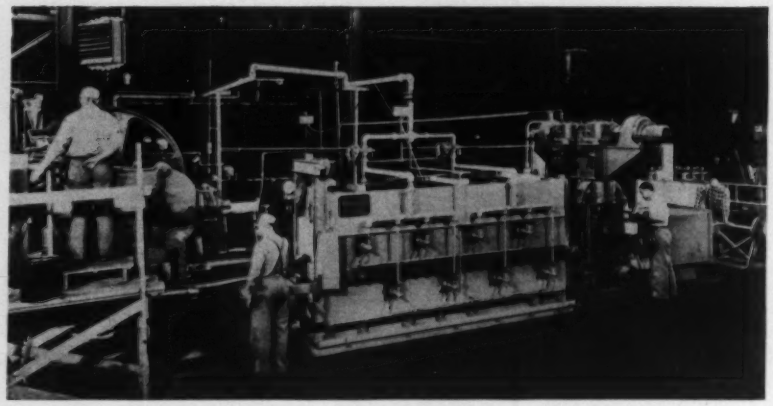
The college years are a period of frequent brand switching, says Mr. Stelzer. Product samples and contests are good ways to promote products. Business sponsored teaching aids are another way of bringing your message to the college market. However, check with administrators and the faculty to see how your story can best fit into curricula.

• **The School Market** — An estimated $7 billion worth of goods and services were sold to public schools in the last school year. And a 33 per cent boost is expected in the next five years.

Furniture, games, teaching aids, educational equipment and supplies, and sporting goods are examples of goods finding major outlets here.

Points to consider: Material suitability, form, size, color appeal, ease of cleaning, durability of finish, and price. The Association for Childhood Education International, Washington, will test your products in a school near your plant.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Powder will be compacted, sintered, rolled in new plant as . . .

Copper Melting Sidestepped

A PLANT that will directly reduce low grade ores into high purity copper will be in operation in the Philippines within two years.

It will be the first example of direct reduction from ore to metal in the copper industry. The operation will eliminate the traditional steps of smelting and refining. A method of chemical leaching and gaseous reduction will be used to obtain a high purity (99.95 per cent) powder from the ores.

The powder will then be converted directly into wrought forms, mainly tubes and strip, using the process and equipment developed by E. W. Bliss Co., Canton, Ohio, in 1958.

While an integrated operation of this type is unprecedented, all phases have been proved commercially in North American plants.

• **Three Nations Involved** — The plant will be owned by Marinduque Iron Mines Agents Inc., a Philippine copper, iron ore, and molybdenum producer. The company has been granted a $13 million loan by the Export-Import Bank of Washington, and it will finance the remainder of the estimated $23 million cost. Prime contractor for the project is Foster Wheeler Corp., New York. Bliss will provide the rolling and fabricating equipment. Chemetals Corp., New York, and Sherritt Gordon Mines Ltd., Toronto, Ont., hold the patents on the reduction techniques. The facility's annual capacity is pegged at 14,000 tons of fabricated copper products and 5000 tons of zinc—either as an oxide or metal.

• **Process to Watch**—If potentials are realized, the new technique could have a radical effect on future copper refining and fabricating operations. Here's why: The capital cost of the plant is said to be 40 per cent less than that for conventional smelting, refining, and casting plants. Further, Bliss claims: "The capital cost of facilities to produce strip and tubing from copper powder is at least 50 per cent less than that of conventional fabricating techniques of starting from cake, ingot, or billets."

Operating costs haven't been disclosed, but the sponsors indicate they'll be considerably below those of conventional facilities.

Another advantage claimed is that small plants are economical. This type plant is said to be efficient at an operating rate of 50 tons a day. In comparison, it is generally believed that a conventional plant must process 200 tons of copper a day to be operated economically.

• **Where in U. S.?**—First use of the process in the U. S. will probably come in a secondary operation, believe insiders. The operation reportedly lends itself ideally to the conversion of scrap. The resulting powder could be converted directly into semifabricated shapes under the same roof.

How Whitecollar Unionization Affects Firms

The National Office Management Association asked managers whose offices are wholly or partially unionized to evaluate the effects of the union . . .

	Yes	No
1. Have management-employee relations improved?	20%	56%
2. Has efficiency: Increased?	12%	
Decreased?	20%	
3. Has management's flexibility in making changes been altered?	36%	54%
4. Has your experience in dealing with discharges been:		
Less satisfactory?	48%	
More satisfactory?	7%	
5. Has the union had any effect on the number of your office employees?		
Increased the number?	17%	
Decreased the number?	3%	
6. Has the attitude of clerical employees toward the union been:		
Favorable?	51%	
Unfavorable?	8%	
Indifferent?	41%	
7. Has the union influenced your promotion practices?	63%	31%

Unions Buck Tough Odds

WHITECOLLAR workers are continuing to snub the union organizer. A survey of 2000 companies by the National Office Management Association, Willow Grove, Pa., finds that whitecollarites are fully or partially unionized in only 6 per cent of the firms.

Don't relax. Unions are still working hard to organize the whitecollar workers. NOMA reports that, of the companies without a union, 3 per cent are aware of groups working toward unionizing their offices; 2 per cent have evidence that their employees are interested in a union; and 10 per cent say their officeworkers have been approached by union representatives for the purpose of establishing unions.

The survey respondents have given four reasons why whitecollarites accept unionization: 1. Unfair wage or salary administration. 2. Inadequate fringe benefits (compared with those received by unionized workers). 3. Lack of firm promotion policies. 4. Supervisors who are not well trained or informed.

Are respondents using personnel policies considered highly desirable in administrative operations? The NOMA survey finds that:

- 86 per cent conduct salary and fringe benefit reviews at least once a year.
- 81 per cent compare their compensation plans with those of local firms.
- 54 per cent have formal job evaluation and classification systems.
- 50 per cent have training programs to provide greater opportunities.
- 50 per cent have written management policies and principles.
- 30 per cent have training programs for supervisors.

Kennedy Faces Opposition on Efforts to Boost Foreign Trade . . . Metalworking's Stake in the Polaris Program

THE PRESIDENT has promised to have all the anti-recession legislation before Congress by Feb. 13. By that time, we will also see where Congressional opposition is developing. For metalworking, the President's State of the Union Message had many points of interest, but the most significant appears to be his emphasis on liberal trade policies—one place where his program will meet serious opposition.

● **BALANCE OF PAYMENTS**—To combat the balance of payments problem, President Kennedy will encourage business to modernize to meet low wage foreign competition. He believes, as did most high State and Commerce Department officials under President Eisenhower, that restrictions on imports are of little use in fighting foreign competition. The Democrats are equally reluctant to cut back foreign aid. So exports must be boosted high enough to overcome imports, foreign aid, the flow of investment capital overseas, and the other factors which make up the balance of payments deficit. The President also pledges to maintain the price of gold at $35 an ounce.

He plans to rely heavily on techniques like Commerce Secretary Luther Hodges used in his native North Carolina (as governor) to entice foreign capital into the U. S. More liberal guarantees will come from the Export-Import Bank of Washington to encourage more firms to launch solid, long range export programs.

The President makes no mention of tightening up our Buy American policies, although he hints that dependents overseas may not have to return as Ike had planned. If that works out, he will have to get such agencies as the International Cooperation Administration to cut their foreign spending to the bone.

● **THE NEW BUDGET**—While conservative congressmen say the liberal trade policies of the President are wrong, some liberals on Capitol Hill are calling President Kennedy too conservative in his fiscal policies. Those who expected a wholesale revision of the Eisenhower budget for fiscal 1962 now learn that the new administration will just "build on the spending and revenue estimates already submitted" (STEEL, Jan. 23, p. 21).

It appears that President Kennedy will limit new spending proposals to about $1.5 billion. That was Ike's predicted surplus, and the President says he will not unbalance the earlier budget himself, although he expects it to be unbalanced because he feels Ike's economists were too optimistic about expected revenues.

Impact of the Polaris Program

OF PRESIDENT KENNEDY's "prompt action" orders to the military, the one for speeding production of the Polaris missile submarine may be the easiest to carry out.

Top Naval officials believe that even with existing facilities, the rate of Polaris sub production could be more than doubled. Metalworking's stake in the program is big.

At least 250 prime contractors and about 9000 subcontractors have been needed so far, says the Navy. About $4.2 billion has been appropriated for the submarines, missiles, support equipment, and training programs. About half of the money has been spent.

● **45 SHIP FLEET?**—Up to the time former President Eisenhower submitted his last budget (STEEL, Jan. 23, p. 21), 14 Polaris submarines had been fully funded. Ike called for another five, plus funds for procurement of long leadtime components for an additional five. By the end of 1961, we will have six Polaris subs, each armed with 16 missiles, on patrol around the world.

The Navy has been pushing for a 45 ship Polaris fleet and has much support in Congress. If Congress and the White House pulled out all budgetary stops, the Polaris program could deploy submarines on station at a rate of 12 a year—once some leadtime problems were hurdled. That would create a 45 ship fleet, costing $8.7 billion, by 1967. Through a gigantic crash program, it's conceivable the program could be completed by 1965.

● **REPLACEMENTS**—One aspect of defense business often overlooked in the Space Age is the necessity of replacing missiles. The Polaris bird is good for five years' shelf life. With a 45 ship fleet, that would mean a minimum of 720 missiles, costing more than $1 million each.

The Polaris subs, costing $100 million each, will probably have to be replaced every 15 years. The Navy figures subs and missiles will run $1 billion a year even after the 45 ship fleet is completed. The figure includes replacement and maintenance costs, plus development of longer range missiles and other system improvements.

The current missile (the A-1) has a range of 1200 nautical miles (about 1380 statute miles). Development is underway on a 2500 nautical (2875 statute) mile, A-3 version which could be ready by 1964.

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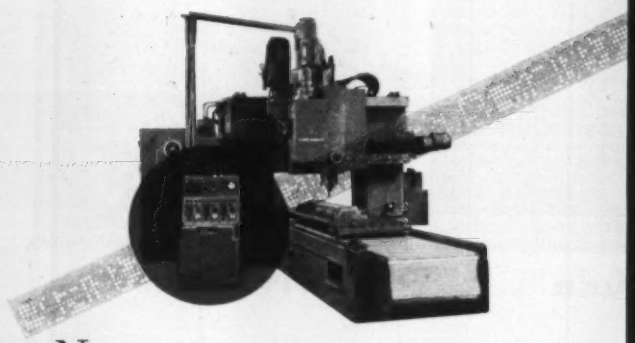

Numerical control is the boss; it tells the machine exactly what to do at a particular time. But to perform the task accurately, the machine must be equipped to follow instructions without benefit of a highly skilled operator. The basic requirement for the highest performance of numerical control is the consideration of the entire machine as a part of the servo system. This means the elimination of backlash and friction, especially in the slide drives; special slideway bearing lubrication (no stick-slip allowed); more precise feed drive parts; extra rigidity throughout; ultra-responsive servo drive.

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Every type of equipment built by Cincinnati Milling's Special Machine Division is considered as a completely coordinated production unit capable of reducing costs, machining an "impossible" job and/or improving quality. Our specialists want to know about your problems. May we hear from you? **Special Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

Numerically controlled milling of an aircraft wing inner panel beam on a new CINCINNATI Bridge-Type Profile and Contour Milling Machine.

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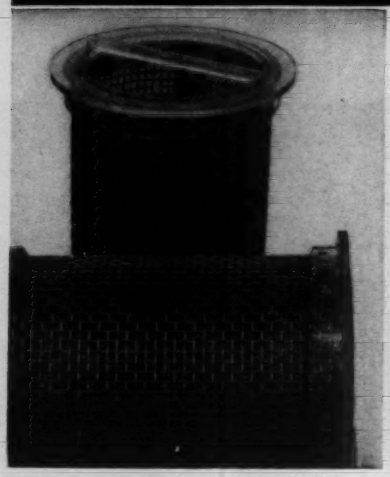

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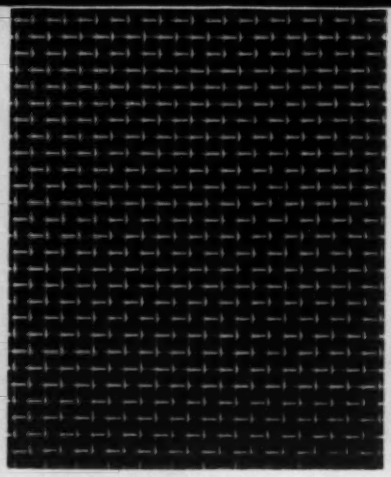
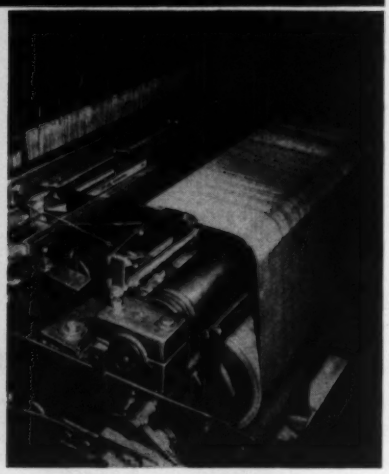


SILVER



TITANIUM

Working with unusual metals or alloys—as well as with standard metals and alloys—is almost an everyday occurrence at Cambridge. For instance, not too long ago, we developed the first practical method of weaving titanium into wire cloth—with mesh counts far higher than had been expected by the customer. Platinum, lead, stainless steel, or bronze—whatever the metal or alloy used, Cambridge has the experience and facilities to produce wire cloth in any size or quantities to the closest tolerances.

If you require fabrications—of any shape or size—Cambridge has the craftsmen and know-how to fill even the most rigid specifications. Or, we'll draw up prints for your approval. There's a wire cloth expert near you—ready to discuss your needs and show you how to get what you want economically and on time. He's your Cambridge Field Engineer... and his name is listed in the Yellow Pages under "Wire Cloth." Or, write for our illustrated, 120-page catalog.

Refer to our technical data sheets in CHEMICAL ENGINEERING CATALOG, Page 185

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*Reg. T.M. of Union Carbide Co.

Wire's Getting More Versatile

Pressure vessel made of wire with 600,000 psi tensile strength is discussed by Boyd P. Doty (left), general manager of sales solicitation for American Steel & Wire Div., and Robert Smith, manager, Product & Market Development Div., U. S. Steel Corp.

WIREMAKERS are touting specialty products these days. Two reasons: Merchant wire shipments have slipped badly, and specialty wires are gaining a reputation for even wider versatility than baling wire.

Technological advances in the last half dozen years have been broadening the market horizons for specialty wires. Two stand out:

- Tensile strengths have been hiked —600,000 psi has been exceeded, and researchers are rapidly moving toward 1 million psi.
- Adhesion characteristics have been improved. Modern wires feature inherent compactness, formability, and resilience. They are being coated, clad, and combined with other metals and materials to achieve new commercial appeal and versatility.

Aggressive marketing is also a key factor in the upsurge of specialty wires. Take the program at American Steel & Wire Div., U. S. Steel Corp.

Last November, AS&W set up a Product & Market Development Div.—it formerly had separate departments for marketing and product development. Robert F. Smith was brought in to head up the new division. He was active in U. S. Steel's marketing programs (Operation Snowflake, the Steelmark campaign, and the canned soft drink promotion).

- **Philosophy** — "Product development and market development are enough alike to be housed under the same roof," says Mr. Smith. "It provides the agency under which we can organize the talent and tools necessary to serve our markets on an industry-by-industry basis. The tools include research, design and engineering, technical services, advertising and merchandising, and national marketing campaigns."

To get greater marketing depth, the new division has representatives for each of these major industries: Agriculture, automotive, construction, and consumer products.

- **Emphasis**—"Indicative of our emphasis in the new program," stresses E. A. Murray, vice president-sales, "is the apportionment of our research budget. About half (more than four times the amount in previous years) of the research budget will be directed into specific product development. The other half will go into cost savings and quality improvement."

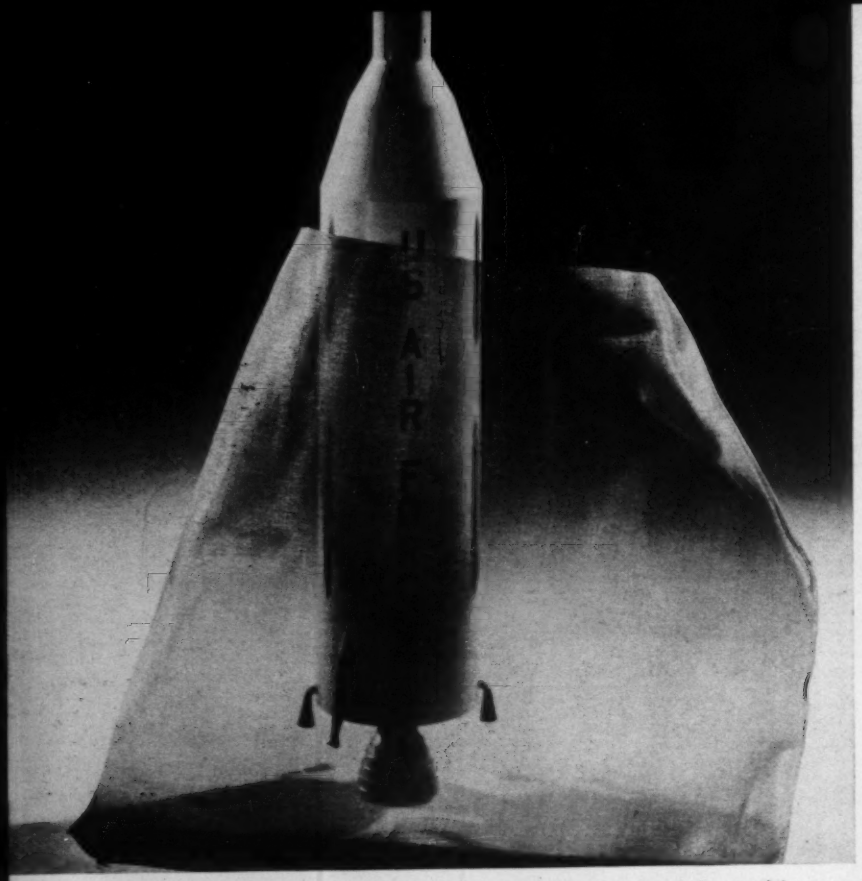
Wire shipments have grown at a slightly faster rate than all steel products generally (see table above). Foreign competition has taken its toll of merchant products like nails, barbed wire, and fencing. The "specialties" accounted for less than

Wiremakers Depend Less on Merchant Products

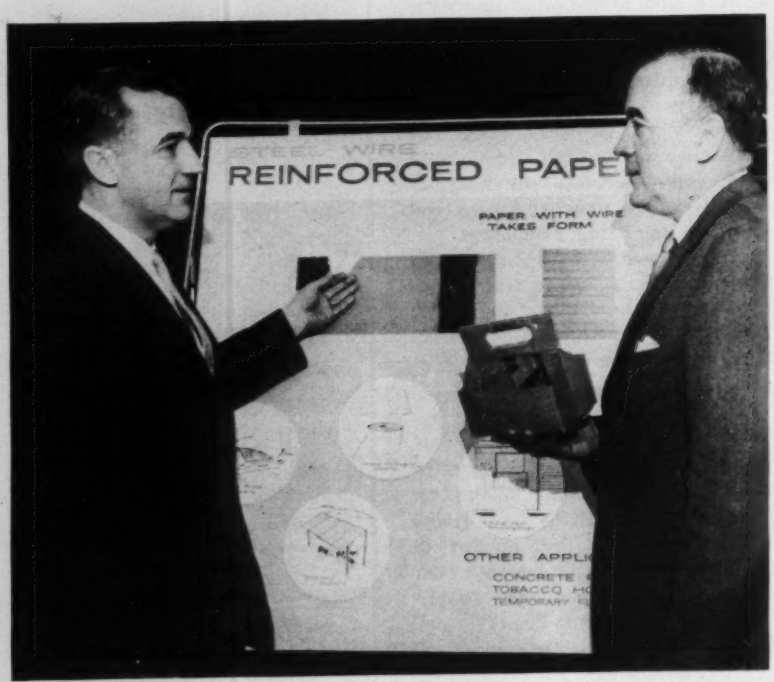
(Millions of tons)

Year	Total Wire Shipments	Total Merchant Wire Shipments
1959	3.29	0.64
1958	2.99	0.68
1957	3.28	0.75
1956	3.86	0.95
1955	4.25	1.13
1950	4.48	1.68
1945	3.2	1.3
1940	2.7	1.15

Source: American Iron & Steel Institute.



Stainless steel cloth, made by W. S. Tyler Co., Cleveland, can be used in space equipment such as parachutes



W. H. Guterl (left), manager of marketing, and E. A. Murray, vice president-sales, point out wire's advantages in reinforcing paper for soft drink cartons

60 per cent of total shipments in 1940; last year, the figure exceeded 80 per cent.

Although AS&W officials expect some increase in the merchant product market at the expense of foreign producers, they look for most of the growth to come in the specialty wires. Expected increase: 2 per cent (or more) per year over the next ten years.

• **What They're Betting On**—Construction industry applications are increasing rapidly, and more will come. In 1950, about 300,000 tons of wire products were used in construction; last year, the market consumed more than 650,000 tons.

Wire reinforced concrete has been a major factor. Now AS&W is looking at wire reinforced wood and plastics to see how they can be utilized in home building.

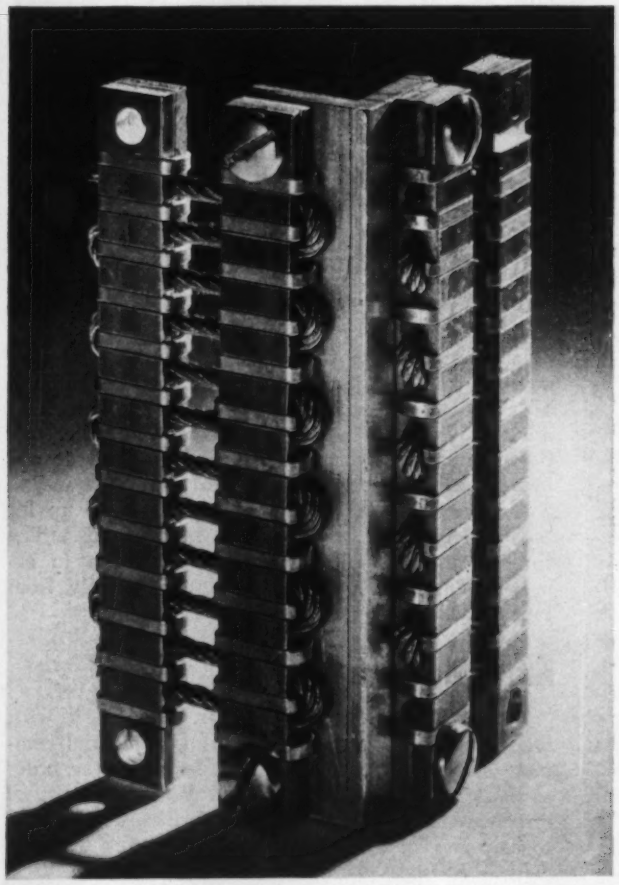
The reinforcement of paper and textiles is another promising area for wire. Mr. Murray points to substantial progress already made in working with carpet manufacturers —wire is being used as backing for carpets.

At the Detroit auto show, AS&W exhibited experimental, wire mesh grillework and dashboards. "In addition to styling opportunities, these dashboards offer safety features superior to today's padded dashes," asserts W. H. Guterl, manager of marketing.

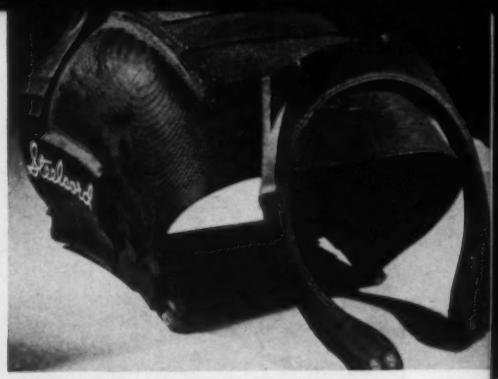
• **Aluminum Coated**—Technological advances in hot dip aluminum coating of wire open tremendous potential in both the specialty merchant wires, says Van H. Leichliter, AS&W's president. "If the results of recent research are borne out, a new product can be offered with high tensile strengths far superior to those of other coated wires now on the market. For merchant applications, it appears that aluminum coated wire will outlast its galvanized counterpart three to five times in corrosion resistance."

Mr. Leichliter sums up AS&W's new approach this way: "To compete in the years ahead, we'll need to do more than develop new products and become more efficient in production. We feel our most promising course lies in gearing our entire management effort to showing our customers—current and potential—how they can grow."

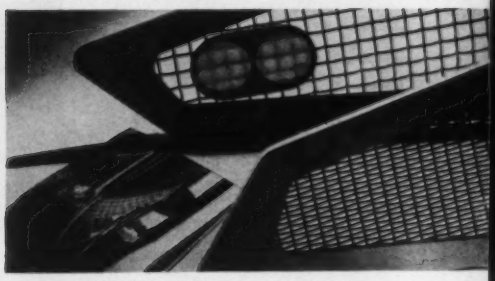
Wire mesh body gives this cutting wheel for nonferrous metals a nonclogging feature. It's made by Reed Research Inc.



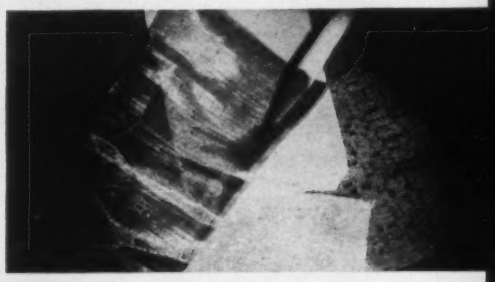
Fine stainless steel wire cable is used to make a unique shock absorber that withstands extreme heat



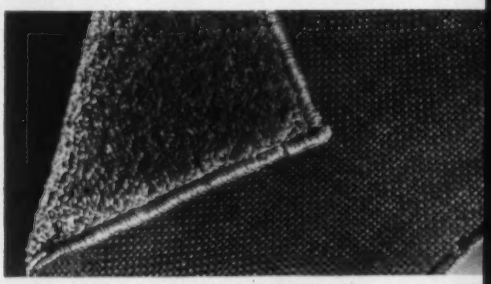
TIRES built with wire cords



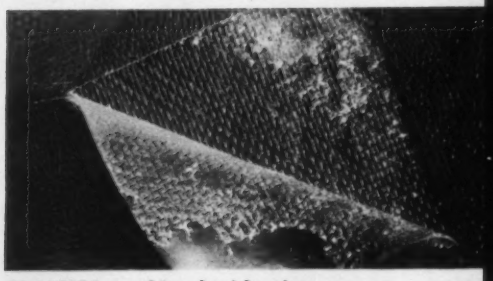
AUTO GRILLES of heavy mesh



CLOTH reinforced with wire

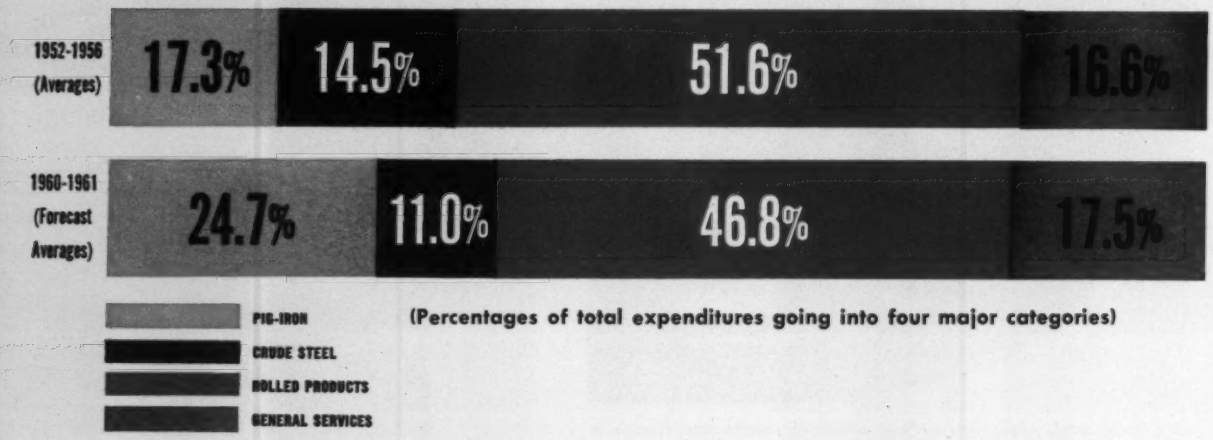


CARPETING gets wire backing



PLASTICS combined with wire

Inner Six Iron and Steel Outlays Reach $838 Million



AN ESTIMATED $838.4 MILLION was invested in the iron and steel industry of the European Coal & Steel Community last year. Another $588.2 million will be spent in 1961. Outlays in 1959 totaled $590.2 million.

Plans call for expanding the community's steel capacity to 90 million tons by 1963. (Production reached a record 80.1 million tons last year, a 15.3 per cent boost over 1959's 69.5 million tons.) Here's how that capacity will be broken down by processes:

Process	1963 Projected Capacity (Millions of tons)	1959 Production (Millions of tons)
Bessemer	42.8	35.4
Open hearth	31.2	25.8
Electric	9.3	6.9
L-D, rotor, and others	6.7	1.3

Investments in rolling mills totaled $389.4 million during 1960 and will total $278.1 million this year. Outlays in the iron ore industry should reach $46.3 million for 1960 and $41 million in 1961. Pig iron capacity is seen at 71.4 million tons by 1963; capacity last year was 63.3 million tons.

U. S., Canada Join European Unit

As soon as the national parliaments ratify agreements signed by representatives of 20 governments at the Organization for Economic Co-operation & Development convention in Paris, the OECD will officially succeed the old Organization for European Economic Co-operation.

The OEEC had largely been an "inward looking" body, concerned primarily with the reconstruction of Europe. With those aims far surpassed, the new OECD, which includes the U. S. and Canada as full members, will be much more "outward looking" than its predecessor. Economic growth on both sides of the Atlantic will be emphasized. Three broad purposes have been set:

- Maximizing economic growth while maintaining high employment, rising living standards, and financial stability.
- Helping less developed countries, both members and nonmembers of the OECD, in achieving sound economic expansion.
- Contributing to the expansion of world trade without discrimination in accordance with international obligations.

British Auto Slide Cuts Steel Orders

British automakers' sales keep slipping. Output is no more than 50 per cent of capacity, reports STEEL's Birmingham correspondent, J. A. Horton. The steel industry is feeling the effects of the cutbacks through a decline in orders for sheets, strip, nuts, bolts, and other materials. Foreign steelmakers will suffer too. Buying of sheets from overseas sources last year was heavy; repetition is unlikely in 1961.

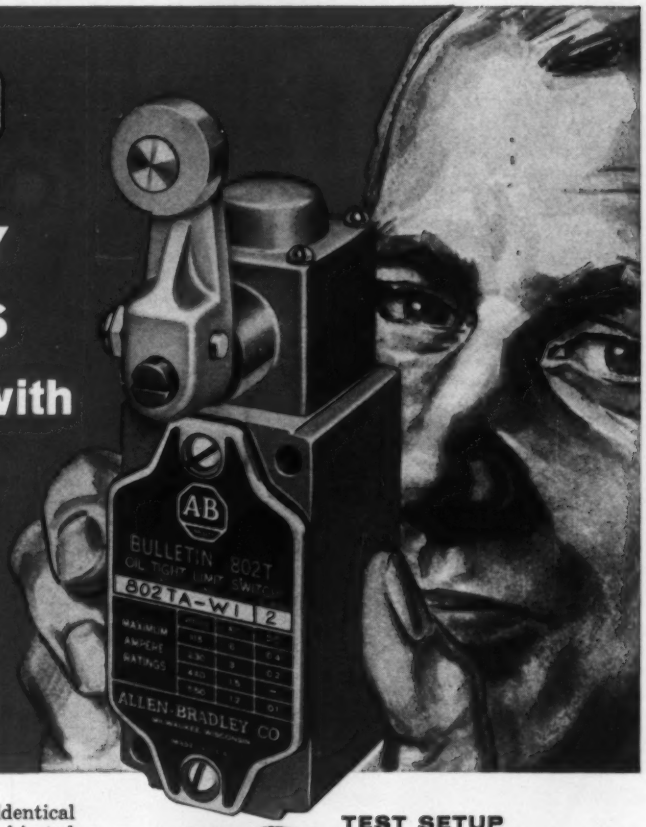
It's clear that export markets won't make up for the drop in home trade for the British mills. The English are complaining about a slowdown in exports. They blame keen competition, mainly from Japan, West Germany, and the U. S.

Krupp Breakup Delayed Again

Alfried Krupp (see STEEL, Mar. 2, 1959, p. 76), sole owner of Germany's vast Krupp industrial complex, has won another year's extension of the order issued by the Allies after World War II to dispose of his coal and steel holdings. The edict was designed to help prevent the rebuilding of Germany's war machine. Reasons for the postponements: The West needs a strong West Germany as an ally; nobody has enough money to buy Krupp out.

Only ALLEN-BRADLEY LIMIT SWITCHES FINISHED TEST with *NO FAILURES!*

...and remained good for many more millions of trouble free operations

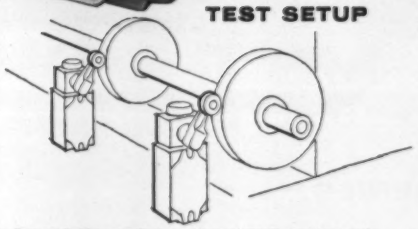


Recently, a large user of limit switches selected two identical units from each of five leading manufacturers and subjected them to the same accelerated life test. When the test was stopped after many, many millions of operations, only Allen-Bradley Bulletin 802T oiltight limit switches were left *with no failures!* Also, a careful inspection of these two Bulletin 802T limit switches suggested that they were still good for *many more millions* of operations.

The Allen-Bradley "built-in" quality is the reason for such unmatched performance. With switch bodies and operating heads positively sealed against oil and dirt, A-B Bulletin 802T limit switches are free from contact fouling and sluggish operation. The precision switch mechanism has a positive snap action—it is impossible for vibration to cause contact chatter. The double break, silver contacts never need servicing.

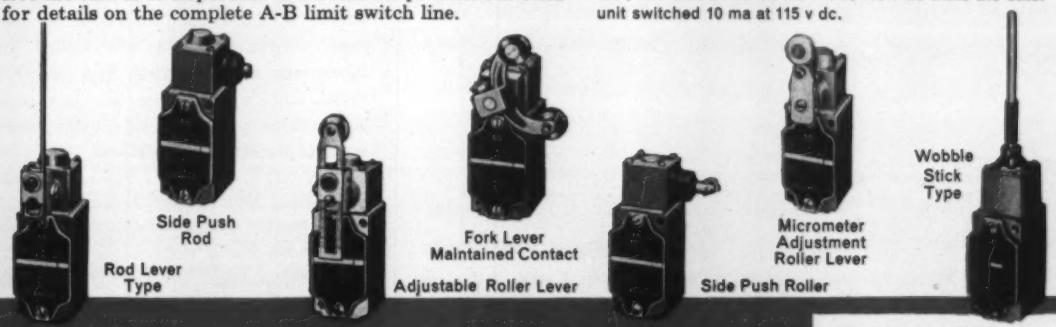
Insist on Allen-Bradley Bulletin 802T oiltight limit switches—they will *always* provide you with the long, trouble free life that is so important to continuous production. Send for details on the complete A-B limit switch line.

TEST SETUP



Purchased through regular supply channels . . .

and tested under identical conditions, insuring an impartial evaluation of performance. Of the ten limit switches tested (two each of five different makes), only three were operating when the test was stopped. Two were A-B Bulletin 802T switches and one of another make, of which the second unit had failed early in the test. On this accelerated life test, one unit switched 1.0 ma at 115 v dc while the other unit switched 10 ma at 115 v dc.



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FOR EXTRA LOAD CAPACITY IN MINIMUM RADIAL SPACE use

McGILL®

GUIDEROL® BEARINGS

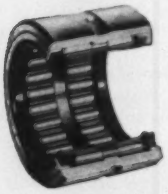
MT SERIES

Here is a compact bearing with high load-carrying capacity. Its full complement of race-width rollers is guided by an integral rail in the outer race bore, providing strength and skewing limitation that prevents binding under controlled misalignment. Rollers are guided at any operational angle from horizontal to vertical — self-cleaning through open ends. Available with or without separate inner ring in shaft sizes from ½" to 9¼". Dimensionally interchangeable with ordinary heavy duty needle bearings.

CT SERIES

Offer full type roller bearing capacity dimensionally interchangeable with ball and cylinder roller bearings of single and double row dimensions. The inner ring may be eliminated for further reduction of radial space.

SEALED—AND STILL COMPACT



No extra axial space needed for the sealed SG series GUIDEROL bearing. Seals are press-fitted securely in the outer race bore to provide the same width and performance advantages of standard GUIDEROL bearings. Contaminants are locked out, lubricants sealed in for those hard to re-lubricate applications. The SG series solves the problem of too-expensive auxiliary sealing assemblies.

Write for McGill's Bearing Catalog #52-A, for engineering data with dimensional and capacity information on McGill needle type roller bearings. Ask about special precision ball and roller bearings.

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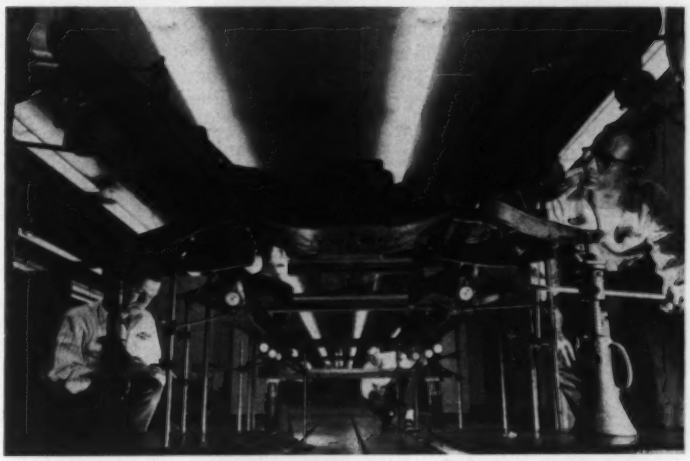
precision needle roller bearings

Detroit Still Favors Frames for Big Cars



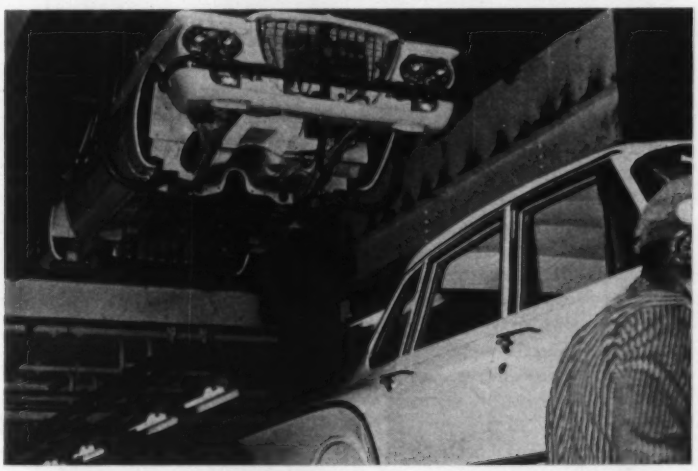
LOOK FOR automakers to stick with body and frame construction on cars longer than 220 in. for some time. Reason: The extra strengthening and soundproofing materials required for unitized bodies of that size make the design heavier and more costly than a separate frame buildup.

Lincoln reputedly proves the point. Ford's luxury car had an integrated body and frame in 1958 when it was 229 in. long. The company has never publicly admitted it, but division engineers have said privately that unanticipated reinforcing and sound absorbing materials added some 460 lb and $104 per unit to the cost of producing the car. Motordom believes that is one of the secondary reasons for scaling Lincoln down to its present 212 in. (Revamped marketing strategy is the prime reason.)

• **Comparisons**—Limiting structural design by length admittedly is an arbitrary way to decide whether to use integral or body and frame construction, but the subject is such a controversial one in the industry that some sort of guide is needed. One of the auto companies has done a survey which shows that unitized bodies can save 400 lb in comparison with body-frame designs if the car has an over-all length of 170 in. But by the time car length reaches 190 in., the weight advantage is down to 100 lb. At 200 in., there is no difference in weight.

The information is based on today's designs. Different concepts or the use of high strength, low alloy steel for supporting members could change length to weight ratios considerably.

Standards May Have Unit Bodies in '63



EVIDENCE is piling up that indicates General Motors Corp. and Ford Motor Co. will switch to unitized bodies on most of their standard 1963 lines. Experience with compacts has proved that the smaller unit bodies are lighter and cost less to make. Standard sized unit bodies are no more expensive than comparable body and frame designs.

The integral bodies tend to localize crash damage and are easier to rattleproof. They tend to spread the load better, which is important

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in today's designs because extra body structure is needed to support heavy glass areas. The concept also makes for roomier passenger compartments.

GM appears to be working on a two year tooling cycle, which means new bodies are due on 1963 models. It's expected that the switch will be made on all standard Chevrolets, Pontiacs, Buicks, and Oldsmobiles. To remain competitive, Ford will unitize the body shell now shared by the standard Ford and Mercury cars. Cadillac and the big Buicks and Oldsmobiles apparently will retain body and frame construction—at least through 1965. Those cars, plus Studebaker's Lark and Chrysler's Imperial, will be the only body and frame types left in the industry.

• **Reactionaries** — The changeover to unitized construction has not come without conflict. There are some engineers and designers in the business who still don't favor it. In 1958, James E. Goodman (then head of GM's Fisher Body Div., now vice president-body and assembly group) declared that there were no important advantages but three major disadvantages to unitized bodies. Compared with body and frame construction, they're noiser, less rigid, and critical dimensions for door and window openings are harder to control, he charged. Fisher Body still has people who feel that way.

But the introduction of Big Three compacts has made for considerable progress. Designers have learned how to improve torsional rigidity without making the body too stiff. They've learned how to spring the body for a smoother ride. They've acquired a large bag of tricks to cut down on noise levels. They've discovered lighter and cheaper sound deadening materials.

Body dipping has provided a way to rustproof hard-to-reach spots in unit structures. Improved welding techniques permit the use of galvanized steel for critical corrosion areas. High strength, low alloy steels are expected to reduce the gage and size of body supporting members. Gatelining and other assembly line procedures have made it easier to control critical body openings.

Most important, perhaps, is the fact that the industry wants to integrate more assembly facilities. It's more costly to assemble both types of cars on the same line. With the high volume compacts already unitized, it seems likely that the switch will ultimately be made on other cars.

• **Slow Progress** — Problems still have to be worked out. Rambler will be beefing up its rear spring shackling system in 1962. Ford has discovered that rust tends to "bleed through" differentially coated galvanized steel, so it's considering a return to equally coated stock. Chrysler has had to strengthen the stub frame on its unit bodies and may switch to fully unitized design when present tooling is amortized. Both Chrysler and Rambler have found that body dipping is not enough. Rambler is already using galvanized on rocker panels. Chrysler will do so next year.

Critics still claim it's more expensive to repair unitized bodies—that appears to be debatable. Another factor: Studies made by Ford engineers (R. H. Fredericks and R. W. Connor) reveal that crash damage is more localized in integral body cars than it is in body and frame types, but there's little difference in passenger safety.

Perhaps the most experienced outlook for unitized bodies comes from American Motors Corp.—it has been building them for 20 years. Carl Cenzer, AMC's executive engineer, asserts: "Using the body as the structural framework of the car provides considerable weight savings because skin members can carry part of the stress. Automatic welding equipment, subassembly procedures, dimensional control fixtures, and minimum use of bolted structures lead to less expensive manufacturing techniques. In addition, the ability to use directly connected front springs and increased torsional rigidity make for an improved ride."

• **Supplier Outlook**—For Detroit's five framemakers (Budd Co.; Dana Corp. and its Parish Pressed Steel Div.; Midland-Ross Corp.; and A. O. Smith Corp.) the move to unitized creates problems. They'll still be able to supply many of the body supporting members. The truck industry will provide a slowly growing market. But it looks like the firms will face the loss of more passenger car frame business within a few years. Several may try for complete body building contracts from automakers. Budd Co. already makes Rambler bodies and has installed one of the industry's most advanced automatic welding and assembly lines in its Gary, Ind., plant.

Welding equipment suppliers will find that unitized bodies require more automatic welders that can handle heavier pressures and current loads. Galvanized steel shipments to automakers will more than double over the next few years. New applications are in view for high strength, low alloy steels. Plastics producers will find growing demand for spray on and foam materials which can double as sealants and sound deadeners.

U. S. Auto Output

Passenger Only

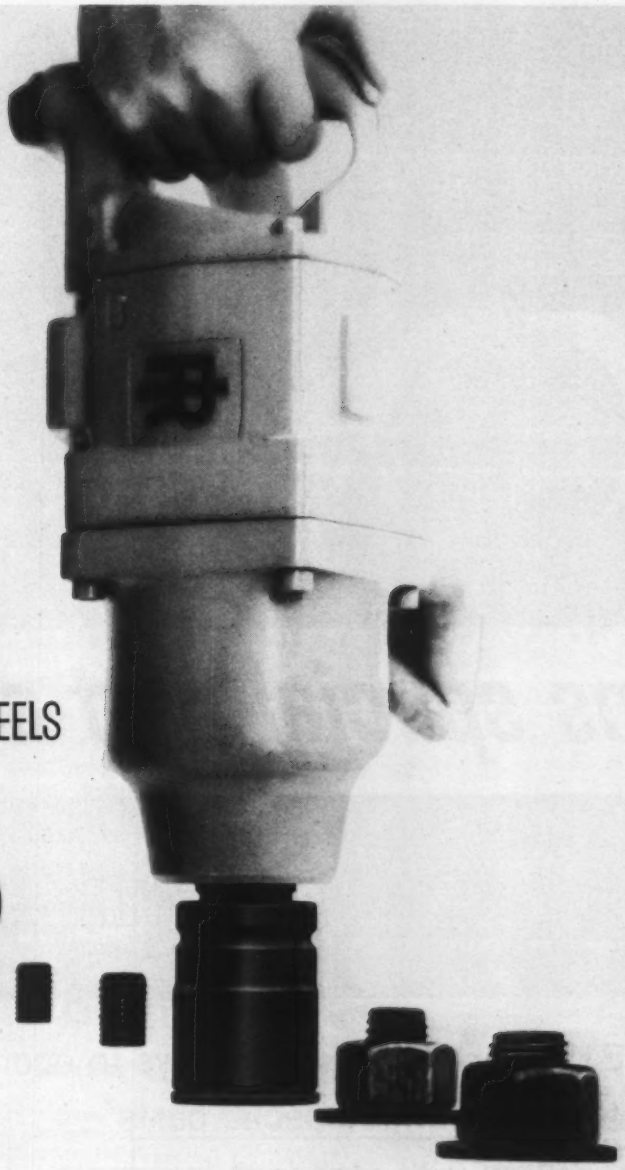
	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
October	617,816	507,527
November	597,132	254,527
December	522,239	494,931
Totals	6,694,354	5,593,707
Week Ended	**1960**	**1959**
Dec. 31	86,497	112,113
	1961	**1960**
Jan. 7	74,204	163,249
Jan. 14	110,808	173,713
Jan. 21	94,155	175,060
Jan. 28	95,973†	173,231
Feb. 4	90,000*	164,027

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

AMC-Willys Deal Discussed

George Romney, president, American Motors Corp., revealed his firm is discussing a possible joint Mexican project with Willys Motors Inc., a subsidiary of Kaiser Industries Corp.

He had no comment on reports that AMC is negotiating to buy out Willys.



IMPACT STRENGTH OF LEAD TREATED STEELS

TORTURE TESTED

3500 TIMES PER MINUTE

Switching to leaded* Aristoloy, Ingersoll-Rand was able to provide the high impact resistance (3500 per minute) and transverse strength required in these hammer case bushings. Use of leaded steel also cut machining time . . . eliminated tearing by the forming tool . . . extended tool life 10% . . . and shortened grinding time. Find out about these free machining lead treated steels—write for LEADED STEELS CATALOG today.

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ARISTOLOY STEELS

DIVISION OF COPPERWELD STEEL COMPANY

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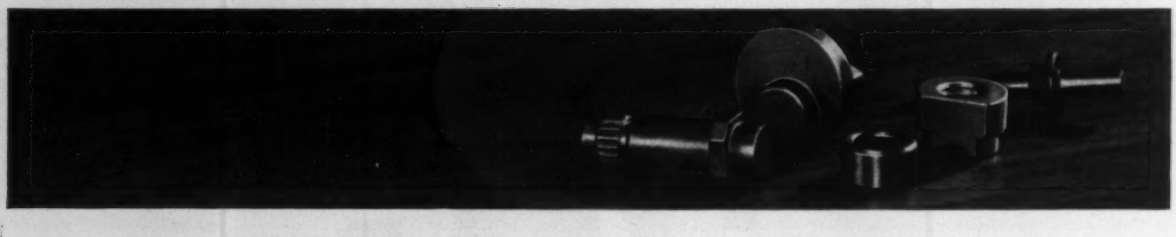
Gains special part at half cost



RB&W survey seeks out ways to economize with cold formed special parts as well as with standard fasteners

Standard fasteners and many cold formed parts are closely related. They're offspring of the same machine. When called in to survey fastener usage, therefore, the RB&W Man can also ferret out those special parts which could be produced faster and for less money on RB&W's cold headers or nut formers.

The hand-held part above, for example, is a car trunk hinge spacer. Its cost was cut 50% when RB&W cold-formers took on the job of pounding them out at high speed, smoothly finished, and ready for installation.

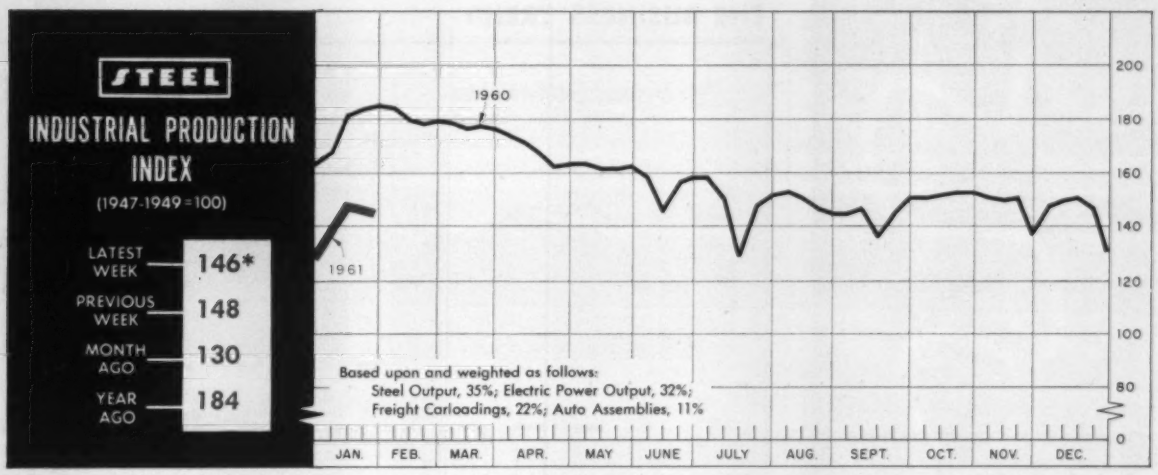
By buying such parts, instead of making them, you save in one or more ways. (1) There's less machining time—or none at all. (2) Assemblies of several small pieces can be made as a unit—reducing assembly costs. (3) When shape of piece is such that you would have to machine excessively from relatively large diameter rod, you avoid heavy scrap loss. Sometimes cold forming becomes the *only* way to economically produce a piece—as for example, the eccentric cam shown above.

To get the most from your dollar in standard fasteners or specials, find out what the RB&W Fastener Specialist can do in cooperation with your engineers. Or write about your requirements in special parts directly to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

R B & W

116th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas. **Sales agents at:** Cleveland; Milwaukee; New Orleans; Denver; Fargo. **Distributors coast to coast.**



*Week ended Jan. 28.

Consensus Puts Upturn in April-May

"CALLING THE TURN" is a fascinating and risky game being played in business circles these days. The object: Pinpointing the next economic upturn. April and May are the choices of a surprisingly large number of players.

"That's the main thing that worries me," observes one veteran player. "When there is such unanimity of opinion, it almost always turns out to be wrong, and the maverick who is considered way too high or low is right."

• **How Much Worse?** — There is scarcely a dissent to President Kennedy's view that economic conditions will get worse before they get better. The big question is: How much worse? With the latest reading (103 in December) of the Federal Reserve Board's industrial production index (1957=100), it seems there is an even chance that the trend line will fall below 100 sometime in the first quarter. (STEEL's index above, which followed a normal path in January, indicates that it didn't happen last month.)

The alternative, it seems, is that the FRB index will continue its downtrend until it reaches 100, then fluctuate around that point (the favorite expression is to advance on a plateau) until something kicks it back up in the spring. Those who favor that pattern—with an upturn early in the second quarter—feel that there are at least a half dozen "kickers."

• **Inventories**—The current recession has been an inventory adjustment to about the same extent as the other three postwar recessions were. There is mounting evidence that the adjustment is nearly complete. In STEEL's latest quarterly survey of metal buyers (see Page 99), there is a definite indication of a turn from inventory liquidation to accumulation.

In its January report, the Business Survey Committee of the Na-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,448[1]	1,466	2,683
Electric Power Distributed (million kw-hr)	14,600[1]	14,817	14,313
Bituminous Coal Output (1000 tons)	7,090[1]	7,985	8,650
Crude Oil Production (daily avg—1000 bbl)	7,200[1]	7,216	7,136
Construction Volume (*ENR*—millions)	$269.2	$359.8	$245.2
Auto, Truck Output—U. S., Canada (*Ward's*)	122,432[1]	120,020	216,199
TRADE			
Freight Carloadings (1000 cars)	495[1]	490	602
Intercity Truck Tonnage (changes from year ago)	−10.6%	−8.2%	+6.9%
Business Failures (Dun & Bradstreet)	340	335	302
Currency in Circulation (millions)[2]	$31,964	$32,287	$31,650
Dept. Store Sales (changes from year ago)[2]	−5%	+7%	+8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,099	$30,708	$25,820
Federal Gross Debt (billions)	$290.6	$290.1	$291.7
Bond Volume, NYSE (millions)	$38.2	$33.3	$28.5
Stocks Sales, NYSE (thousands of shares)	21,900	20,734	14,005
Loans & Investments (billions, adjusted)[3]	$108.8	$109.1	$102.8
U. S. Govt. Obligations Held (billions)[3]	$30.3	$30.2	$26.9
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	211.7	211.7	234.0
All Commodities[6]	119.8[1]	119.8	119.5
Commodities Other than Farm & Foods[6]	128.2[1]	128.2	128.6

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

BRMCO
SPECIAL ALLOYS
slash material costs

BRMCO-developed aluminum, brass, and bronze alloys often replace higher priced strip metals . . . cut material costs, while promoting longer tool life, fewer rejects, increased production.

A pressure gauge manufacturer, for example, cut gear segment material costs 25% by changing to a BRMCO formulated strip. The manufacturer had been using Grade A phosphor bronze; then tried leaded phosphor bronze in an effort to improve machinability, increase production. When the leaded phosphor bronze failed to do the job, BRMCO was called in and quickly developed a special bronze alloy. Labeled "LED-O-LOY," this BRMCO Strip provides this manufacturer with greater workability, machinability, and wear resistance—while reducing his material costs 25%.

BRMCO special alloys may solve your production and cost-reduction problems, too. Write or call today, outlining your requirements. If you phone, call EDison 7-4434 (Bridgeport — collect) and ask for Larry Hayden, field service department.

FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

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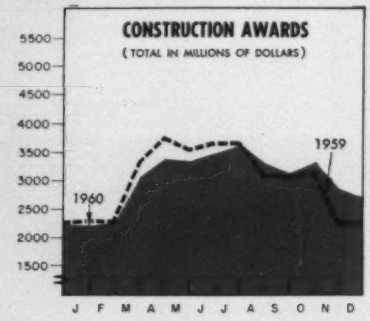
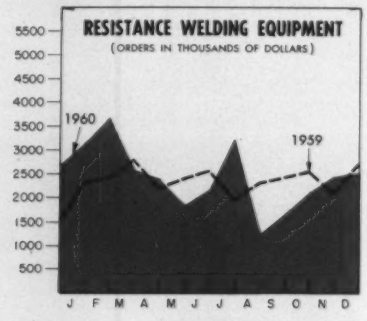
ATCO CHEMICAL-INDUSTRIAL PRODUCTS, INC.

THE BUSINESS TREND





	Total		Building	
	1960	1959	1960	1959
Jan.	2,193	2,314	1,728	1,835
Feb.	2,240	2,307	1,685	1,777
Mar.	3,046	3,340	2,361	2,454
Apr.	3,360	3,778	2,527	3,018
May	3,337	3,542	2,563	2,749
June	3,472	3,659	2,593	2,817
July	3,597	3,657	2,481	2,881
Aug.	3,295	3,084	2,550	2,512
Sept.	3,119	3,058	2,402	2,472
Oct.	3,319	3,135	2,555	2,518
Nov.	2,886	2,373	2,169	1,893
Dec.	2,718	2,224	1,872	1,783
Totals	36,318*	36,269*	27,345*	28,536*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.
Charts copyright, 1961, STEEL.

	Net Orders		Shipments	
	1960	1959	1960	1959
Jan.	3,258	2,396	1,582	1,427
Feb.	3,732	2,457	2,563	1,889
Mar.	2,653	2,811	3,011	2,179
Apr.	2,446	2,258	2,943	2,193
May	1,871	2,407	2,310	2,019
June	2,205	2,597	3,267	2,702
July	3,244	1,980	2,221	2,269
Aug.	1,330	2,322	2,528	2,928
Sept.	1,689	2,435	2,559	2,113
Oct.	2,145	2,599	2,328	2,097
Nov.	2,457	2,131	1,927	1,597
Dec.	2,525	2,768	1,974	2,353
Totals	28,933	29,161	29,218	25,766

Resistance Welder Manufacturers' Assn.

tional Association of Purchasing Agents also noted a slowing down of inventory cutting. Thirty-one per cent of the reporting members reported further curtailments compared with 37 per cent in December.

Inventories of finished goods still pose the biggest problem. As long as the pipeline is full, there isn't likely to be a sharp reversal of the inventory trend in semifinished goods or raw materials. More likely: Stability until finished goods are brought in line, followed by some stock building in the second quarter. The fact that producers will be buying materials and parts at the same rate they consume them will be a plus factor.

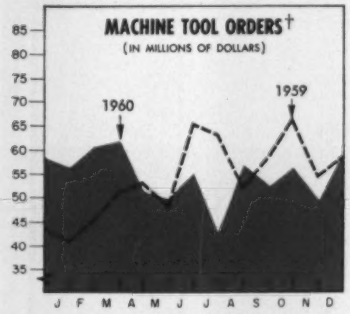
● **Construction**—There is a record volume of work on the books. Its full impact will be felt when there is a break in the weather. Contract awards last year set a record for the fourteenth consecutive year, states F. W. Dodge Corp. (See table and graph above.) While they slacked off a little in January (source, the weekly tabulation of *Engineering News-Record*), the development will not affect the outlook for spring building.

The stimulus of construction on employment, steelmaking, hardware, and lumber could be one of the biggest reasons for pegging the turn in early spring.

● **Pipelines** — As reported in the Jan. 30 issue of STEEL, (p. 129), pipeline construction should also be at a record pace in 1961. Steelmen are already booking tonnage for delivery when the weather breaks. The business will be a big boost for such distressed areas as Birmingham, Youngstown, and Lorain, Ohio.

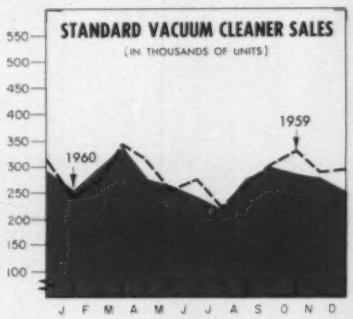
● **Automobiles**—One of the biggest depressants in the first quarter will be the auto industry, which is suffering from overstocks and slow sales of new cars. Producers are blaming severe weather for disappointing January sales. *Ward's Automotive Reports* says used car prices, strong truck sales, good sales in the luxury classes, and a rich sales mix favoring the more expensive models in the low priced field indicate the market has not fallen apart.

While any pickup in second quarter auto production schedules may be less than it has been in some years, it still will add somewhat to the over-all economic strength.



	New Orders (000 omitted) 1960	1959	Shipments (000 omitted) 1960	1959
Jan.	$56,450	$41,050	$46,400	$31,300
Feb.	60,600	45,400	51,950	36,050
Mar.	61,950	51,550	64,500	45,750
Apr.	51,850	53,200	55,100	45,000
May	49,950	48,700	56,350	41,000
June	55,100	65,400	63,100	50,050
July	42,950	63,400	51,300	40,600
Aug.	56,850	52,200	47,900	40,300
Sept.	52,300	58,850	53,950	46,150
Oct.	56,200	66,650	51,350	51,500
Nov.	49,950	54,250	48,550	46,600
Dec.	59,250*	58,300	60,450*	63,850
Totals	$653,400*	$658,950	$650,900*	$538,150

†Cutting and forming. *Preliminary.
National Machine Tool Builders' Assn.



	1960	1959	1958
Jan.	258,330	242,516	265,489
Feb.	294,483	271,396	225,631
Mar.	339,918	346,557	291,418
Apr.	278,391	317,402	247,293
May	265,556	257,345	218,766
June	245,790	275,974	253,127
July	223,008	221,232	263,778
Aug.	280,575	268,465	280,226
Sept.	301,935	305,096	299,618
Oct.	290,059	330,899	339,127
Nov.	280,550	290,130	293,609
Dec.	254,631	293,818	316,965
Totals	3,313,226	3,420,830	3,295,047

Vacuum Cleaners Mfrs. Assn.

• **Government**—President Kennedy has promised immediate action to help distressed areas and to combat unemployment. It will take time for many of his actions to be felt in the general economy. But it is conceivable that he and his advisers will find a few methods of priming the pump in the next 90 days—and also help any April-May upturn gain strength.

• **Steelmaking**—The upward trend will be evident in steelmaking operations before the second quarter is too far gone. Despite a slip in output in the last week of January, producers still see a gain in operations coming up in March, if not before. It won't constitute a complete recovery by a long shot, but it could be a bit more than the usual seasonal improvement.

Other factors which could stimulate spring business include a possible income tax cut (it could come if unemployment becomes too severe) and a growing concern about the possibility of a strike in the automotive industry later in the year.

Capital Spending Outlook Off

However, not all signs point to an early upturn. One causing considerable concern is the slowdown in expenditures for capital equipment. The National Association of Purchasing Agents' survey reveals that only 22 per cent of the respondents plan to increase capital expenditures this year, while 30 per cent expect to cut them.

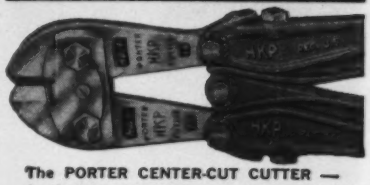
But the optimists continue to point out that the decline in capital spending will not be as great as it was in previous recessions, mainly because the buildup after 1958 was not as great. Furthermore, they claim that the need for modernization to protect already slim profit margins will mitigate the spending cutback.

Trends Fore and Aft

• About 150,000 workers, mostly in metalworking, will get cost of living raises of 1 or 2 cents an hour because of the rise in the consumer price index in December. The index again set a record at 127.5 (1947-49 = 100).

• Bankruptcy cases in fiscal 1960 (ended June 30 last year) reached a new peak of 110,034, says Commerce Clearing House, Chicago. Most were personal and nonbusiness, but a record 12,284 were in the business category.

THERE'S A



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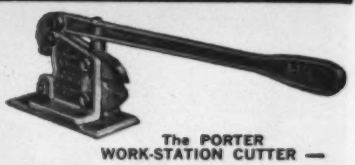

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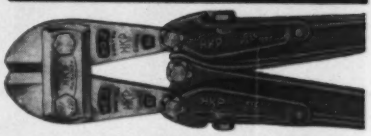
FOR EVERY



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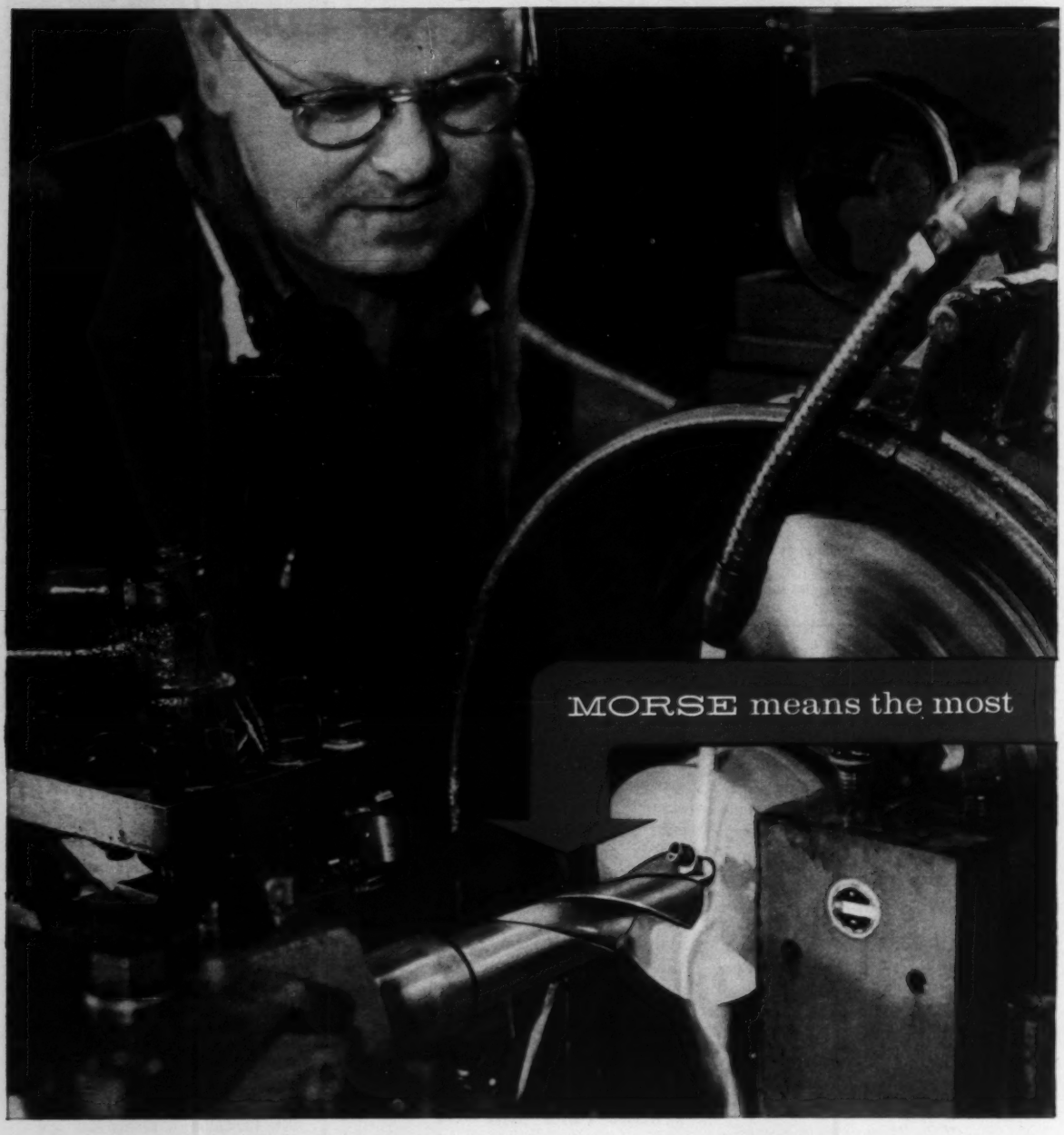

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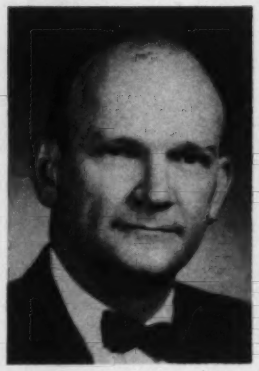
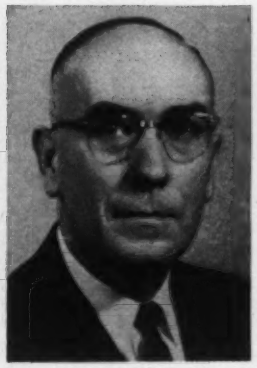


F. STEELE BLACKALL III
Taft-Peirce president



M. W. GRIFFES
Euclid Electric eng. dir.

CHARLES R. BILLMAN
Simpson Elec. mfg.-v. p.

A. BRENT WILSON
Harbison-Walker president

F. Steele Blackall III was elected president of **Taft-Peirce Mfg. Co.**, Woonsocket, R. I., to succeed his father, **Frederick S. Blackall Jr.**, who becomes chairman, treasurer, and chief executive officer.

M. W. Griffes was made director of engineering, **Euclid Electric & Mfg. Co.**, Madison, Ohio. **Clive Yeomans** was made director of advanced research. Mr. Griffes was chief engineer. Mr. Yeomans was manager, Industrial Products Div., at the Cleveland Div. of Victoreen Instrument Co.

Eugene R. Coker was named a purchasing agent for **Armco Div.**, Armco Steel Corp., Middletown, Ohio, responsible for purchases of construction services, equipment, and heavy equipment spare parts. **John M. Leighton** retires as supervising purchasing agent. **William M. Schuck**, assistant to the director of purchases, will purchase ferroalloys, formerly handled by Mr. Leighton.

Thaddeus F. Bell was elected to the new post of executive vice president and general manager of **Interlake Iron Corp.**, Cleveland. Retirements of **J. Paul Fagan**, vice president-treasurer, and **John H. McDaniel**, vice president-operations, are announced.

Willard F. Bates was made director of manufacturing, Data Recorders Div., **Consolidated Electrodynamics Corp.**, Pasadena, Calif., subsidiary of Bell & Howell Co. He was factory manager at Ryan Electronics Div., Ryan Aeronautical Co.

Charles R. Billman was made vice president-manufacturing, **Simpson Electric Co.**, Chicago. He was assistant to the president and general manager, National Electric Div., H. K. Porter Company Inc.

Webster D. Corlett, chairman and chief executive officer of **Standard Screw Co.**, relinquishes operating direction of Chicago Screw Co. Div., Bellwood, Ill., to **Paul A. Mongerson**, new vice president-general manager. **James A. Taylor**, president of Standard Screw, relinquishes direction of Hartford, Conn., Machine Screw Co. Div. to **Michael J. Perrin**, new vice president-general manager. At Western Automatic Machine Screw Co. Div., Elyria, Ohio, **Theodore R. Pleines** was made vice president-general manager. Its direction was under **A. D. Rose**, who will concentrate activities in his Standard Screw capacity as vice president-manufacturing for all company divisions. **Hartley Q. Torrison** was made vice president-controller of Standard Screw Co.

Robert W. Payne was made sales administrator at the Cleveland Div. of **Precision Castings Co.**

Paul J. Chaney was made vice president of **Sumitomo Shoji New York Inc.**, New York. He is responsible for management of its newly formed Tubular Products Div., and directs sales and promotion of tubular products manufactured by Sumitomo Metal Industries Ltd., Osaka, Japan. He was general sales manager, Metals Processing Div., Curtiss-Wright Corp., in Buffalo.

A. Brent Wilson was elected president, **Harbison-Walker Refractories Co.**, Pittsburgh, to succeed **Earl A. Garber**, now chairman and chief executive officer. Mr. Wilson was executive vice president.

James M. Hughes was made sales manager, regular products for **Dresser Mfg. Div.**, Bradford, Pa., Dresser Industries Inc. For the last two years, he has been general sales manager of Reactive Metals Inc.

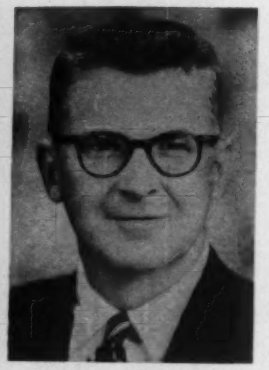
Norman A. Birch was appointed technical director of **Albion Malleable Iron Co.**, Albion, Mich. He was with American Brake Shoe Co. from 1939 to 1960 in research, metallurgy, and operations.

J. W. Anderson was made manager, Power Transmission Sales Dept., **Hewitt-Robins Inc.**, Stamford, Conn. Since 1955, he has been in charge of sales of the Union Chain Div. at Sandusky, Ohio.

Leonard A. Wood was made general superintendent of production at the Massena, N. Y., aluminum foundry of **Chevrolet Motor Div.**, General Motors Corp. He succeeds **George H. Johnson**, named general superintendent of production at Chevrolet's gray iron foundry at Saginaw, Mich.

J. J. Kroecker was made sales manager, **Permold Co.**, Medina, Ohio. He was a general sales and service engineer, responsible for sales of sand castings and aluminum highway products. **L. E. DeGroat**, vice president-sales for 20 years, continues as vice president, de-

HAROLD E. PINK



JOHN B. HANSON

Cambridge Wire Cloth appointments

ROBERT PENOVICH

L. P. FOWLER

Republic Steel appointments

voting his efforts to market development.

Harold Pink was elected vice president of **Cambridge Wire Cloth Co.**, Cambridge, Md. He was assistant to the president in charge of the Wire Cloth Div. **John B. Hanson**, former manager of internal sales, Wire Belt Div., was made general sales manager of the company.

Quigg Lohr was elected a vice president of **American MonoRail Co.**, Cleveland. He continues as secretary.

W. Gerald James was named special assistant to vice president for advanced development at **Melpar Inc.**, Falls Church, Va. He was manager of the Electronics Research & Development Laboratory of American Machine & Foundry Co., Alexandria, Va.

Joseph J. Diamond was made vice president-field sales for **Porter-Cable Machine Co.**, Syracuse, N. Y. He was vice president-Eastern sales.

Republic Steel Corp. named **Robert Penovich** superintendent of its **Union Drawn Steel Div.** plant in Beaver Falls, Pa., to succeed **Aaron B. Seitz**, who continues as a member of Union Drawn's metallurgical staff. Mr. Penovich was assistant superintendent of the Massillon, Ohio, operations. **L. P. Fowler** was made sales manager, **Reclaimed Steel Div.**, Cleveland. He succeeds **Frank L. Rownd**, retired.

Leo C. Hilt was named assistant superintendent of **Colorado Fuel & Iron Co.'s** seamless tube mill at the Pueblo, Colo., plant.

D. W. Kaufmann was made product manager of stainless steels for **Crucible Steel Co. of America**, Pittsburgh. He is responsible for vacuum melted, high temperature alloys; superalloys; and titanium. He was product manager of tool steels.

Ross S. Peterson was appointed product sales manager for **Sperry Products Co.**, Danbury, Conn., division of Howe Sound Co. He was field sales engineer with Magnaflux Corp.

Harold C. Stone was appointed chief metallurgist, **American Steel Treating Co.**, Crystal Lake, Ill. He held a similar post at Le Tourneau-Westinghouse Co.

Paul K. Webster, industrial sales manager in Indianapolis for **Minneapolis-Honeywell Regulator Co.'s** Industrial Products Group, was made metals processing market manager with headquarters in Philadelphia. Succeeding him is **G. D. Northern. Robert W. O'Reilly** was made branch industrial sales manager in Baltimore to succeed **W. J. Law**, named an account executive.

Robert W. Halberg was made associate director, Automotive Dept., **Roy C. Ingersoll Research Center**, Chicago, Borg-Warner Corp.

Robert J. Brandt was made sales manager, **Barker Milling Machine Div.**, F. Hohlfelder Co., Cleveland. He was a former owner and presi-

JOSEPH J. DIAMOND

Porter-Cable sales v. p.

D. W. KAUFMANN

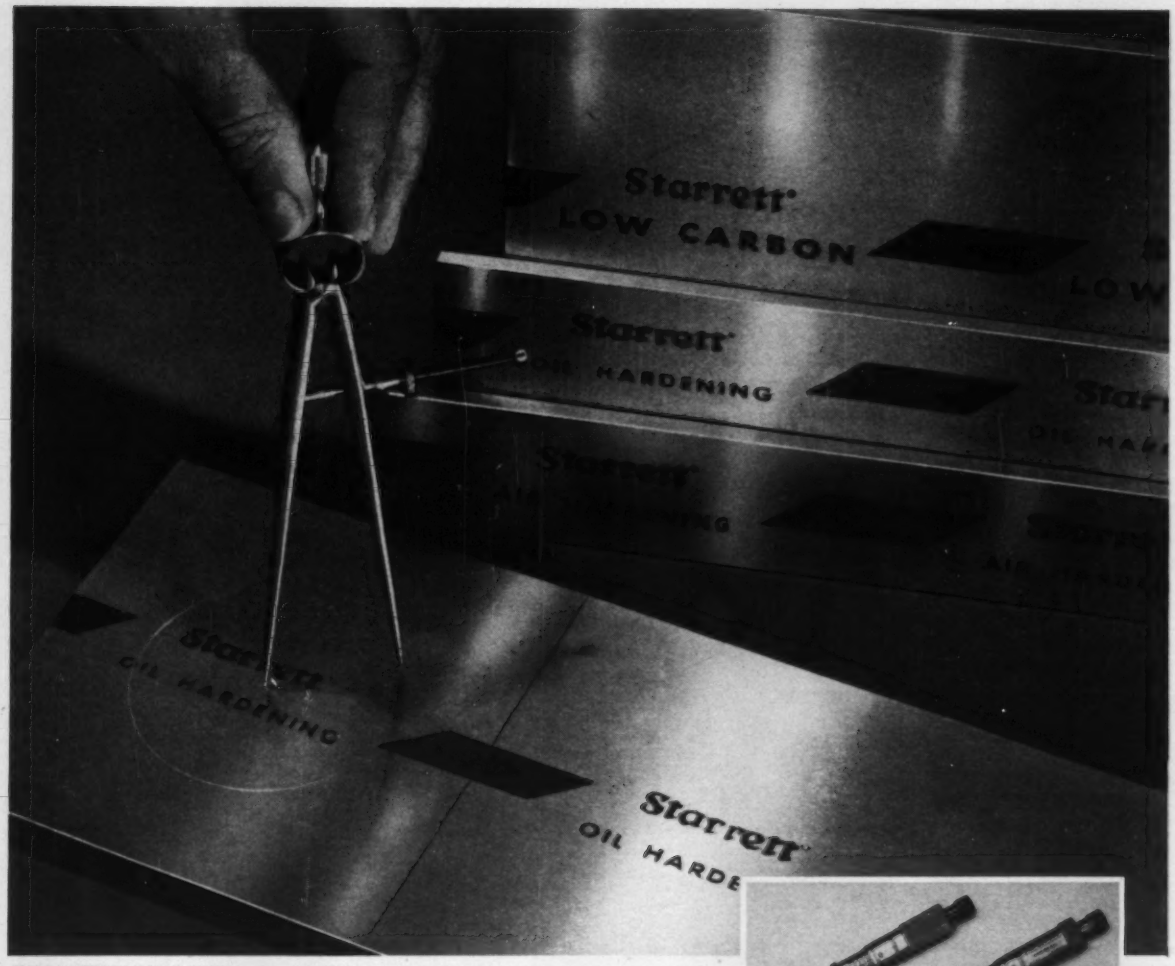
Crucible product manager

ROSS S. PETERSON

Sperry Products sales post

ROBERT J. BRANDT

Barker Milling Machine sales



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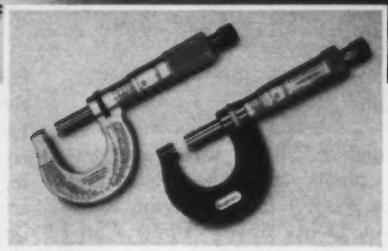

PRECISION TOOLS

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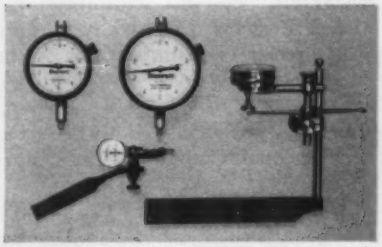
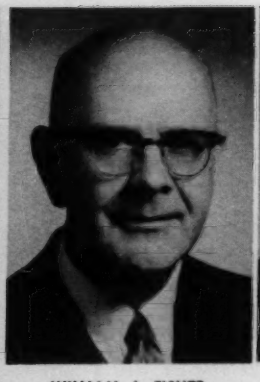
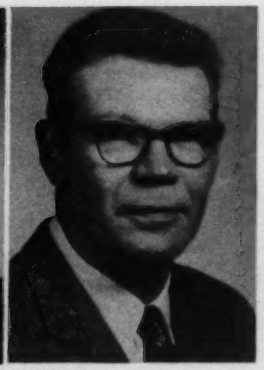


HACKSAWS, HOLE SAWS, BAND SAWS, BAND KNIVES

EVERETT BABBE
Temptron chief eng.



WILLIAM J. FISHER
Berkeley Co. sales mgr.



EDWIN J. BERNARD
Amsler Morton div. post

KENNETH L. SNOVER
Remington Rand Univac post

JAMES H. DAVIDSON
American-Lincoln marketing

J. W. MURPHY
Allegheny-Ludlum post

dent of North East Brandt Co., Branford, Conn.

Kenneth L. Snover was made general plants manager (Ilion and Utica, N. Y.) for **Remington Rand Univac Div.**, Sperry Rand Corp. He is responsible for manufacturing operations. He was with International Business Machines Corp. as director of manufacturing control, General Products Div.

James E. Potts was appointed a vice president of **Union Carbide International Co.**, New York, division of Union Carbide Corp.

A. William Tolder was made general manager, **Morton Machine Works Div.**, Brubaker Tool Corp., Millersburg, Pa.

Sam A. Seckler was made Chicago district sales manager, **Republic Steel Corp.**, to succeed **Thomas J. Gerwig**, now acting as a consultant. Mr. Seckler was assistant manager, Alloy Sales Div., Canton, Ohio.

James H. Davidson was appointed vice president-marketing, **American-Lincoln Corp.**, Toledo, Ohio. He recently was vice president-marketing for Rogers Industries, Detroit, and previously held the same position at Clinton Engine Co.

J. W. Murphy was promoted to product manager, stainless steel sheets and plates, **Allegheny Ludlum Steel Corp.**, Pittsburgh, assuming responsibilities for plates formerly handled by **L. F. Lippert**, retired.

Thomas J. Bullock was made director of marketing, Compressor Div., **Fairbanks, Morse & Co.** He is in Chicago executive offices. Compressors are produced at the Beloit, Wis., Works.

Allison L. Augur was elected president, **Bastian-Blessing Co.**, Chicago, to succeed **Lewis G. Blessing** now chairman. **Lawrence L. Lucas** succeeds Mr. Augur as executive vice president.

Everett Babbe fills the new post of chief engineer for **Temptron Inc.**, Reseda, Calif. He was with Marquardt Corp.

William J. Fisher was appointed sales manager of **Berkeley Co.**, Danville, Ill., subsidiary of McKay Machine Co. He was Midwestern regional engineer, Special Products Dept., Air Reduction Sales Co.

Edwin J. Bernard was made manager, Non-Ferrous Div., **Amsler Morton Co.**, Pittsburgh. He was with Loftus Engineering Co.

William A. Hopkins was made electroplating product specialist for **Metal & Thermit Corp.** He has headquarters in Detroit.

OBITUARIES...

William E. Hall, 84, chairman and cofounder of **Duriron Co. Inc.**, Dayton, Ohio, died Jan. 23.

Paul Pigott, 60, president, **Pacific Car & Foundry Co.**, Rochester, Minn., died Jan. 23.

Eduard J. W. Egger, 63, regional engineer for **Linde Co.**, division of Union Carbide Corp., died Jan. 22 at his home in Bellevue, Pa.

Griswold A. Price, 62, assistant vice president-sales, Western area, **U. S. Steel Corp.**, Chicago, died Jan. 26.

John G. Murray, 54, vice president-technical director, **Continental Can Co.**, New York, died Jan. 26.

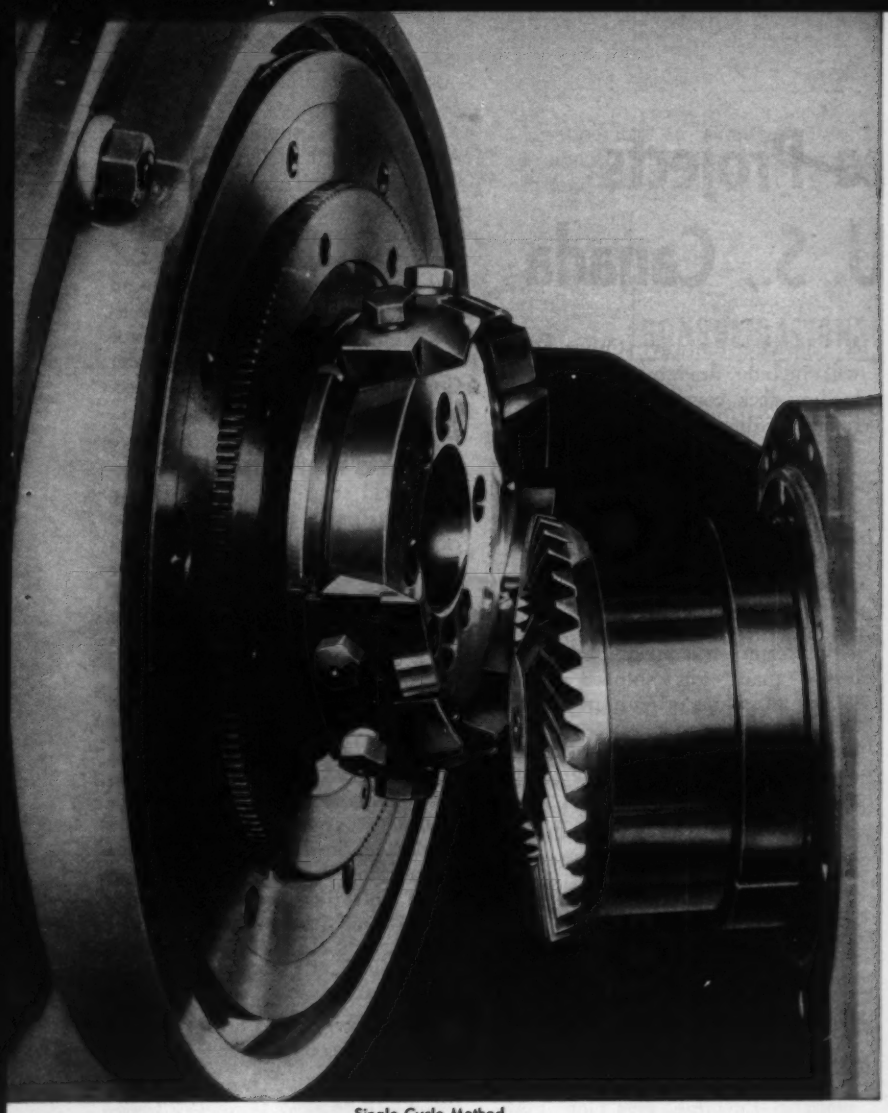
Louis F. Heckmann, 63, vice president-sales, **Union Metal Mfg. Co.**, Canton, Ohio, died recently.

William Finneran, Chicago district sales manager, Welding Products Div., **A. O. Smith Corp.**, died recently.

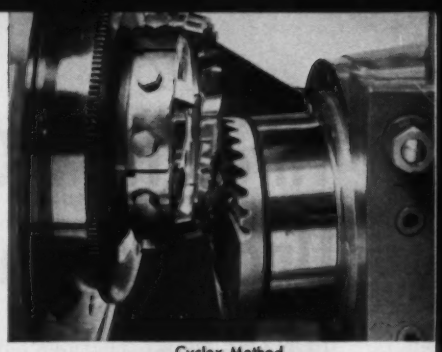
Wesley S. Walker, 56, sales manager-carbide for **Union Carbide Olefins Co.**, New York, a division of Union Carbide Corp., died Jan. 18.

Harry C. Davis, 58, chairman, **Kanawha Mfg. Co.**, Charleston, W. Va., died Jan. 5.

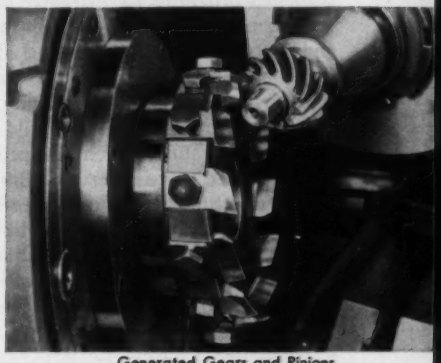
Edward L. Hanson, 60, vice president, **Frank G. Hough Co.**, Libertyville, Ill., died Jan. 11.



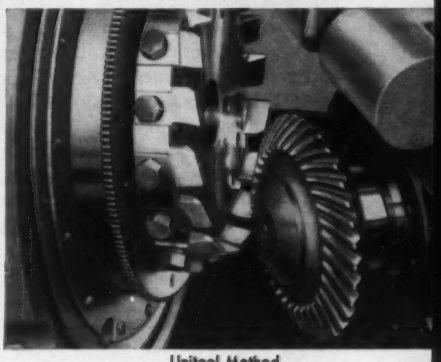
Single Cycle Method



Cyclex Method



Generated Gears and Pinions



Unitool Method

Cut gears with *four* different methods on *one* machine

If you expect your gear needs to change over the years you'll appreciate the exceptional versatility of the Gleason No. 108 Hypoid Generator. With this one machine you can cut both gears and pinions by four different methods:

Single Cycle® Method. Using this method you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine using the conventional single-roll Generating Method.

Cyclex® Method. For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

Generated Gears and Pinions. You can produce both gears and pinions on this machine with the Generating Method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter.

Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

The No. 108 Generator cuts gears up to 8½" diameter at a 10:1 ratio and to a maximum of 4 DP. You can get the same versatility in cutting larger gears with the No. 118 Hypoid Generator which handles gears up to 18" diameter, 10:1 ratio, to a maximum of 2 DP. A third model, the No. 28 Hypoid Generator, cuts gears up to 33" diameter at 10:1 ratio, 1½ DP.

Send for free bulletins on all three machines.

*Trademark

GLEASON WORKS

72

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

Three New Ore Projects Underway in U. S., Canada

IRON ORE mining companies have launched programs for extensive development of low grade ore (jasper and taconite) deposits in the Lake Superior region of the U. S. and high grade ore deposits in Canda.

Empire Mining Co. will build a mill near Negaunee, Mich., for processing jasper ore; Reserve Mining Co. is expanding its taconite processing facilities at Silver Bay, Minn. (STEEL, Jan. 30, p. 92); and Wabush Iron Co. Ltd. has started construction on a project in Canada.

• **Negaunee Project**—Empire Mining Co. is operated by Cleveland-Cliffs Iron Co., Cleveland. The ore body is magnetic and will be separated from the waste rock by magnetic separators. Officials say it is the first magnetic, low grade deposit to be developed in the Michigan mining region. The flotation process is used at the nearby Humboldt and Republic mines (also operated by Cleveland-Cliffs).

At Empire, jasper rock containing about 30 per cent iron will be mined by the open pit method. The crude ore will be beneficiated in a large crushing, grinding, and separation plant. The concentrate will contain more than 65 per cent iron. The fine concentrate will be pelletized into marble sized balls of high grade iron ore and baked to a flintlike hardness for maximum performance in lower lakes blast furnaces.

Empire will have an annual capacity of more than 1 million tons of pellets in the first stages of operation. When it is completed (possibly in 1963), total annual production of pellets by Cleveland-Cliffs and its partners in the Marquette, Michigan, range will reach 3.25 million tons.

• **Wabush Iron**—Construction will start this year on a $20 million, Wabush Lake, iron ore project in Canada. A 25 mile railway will be built from a harbor site in the vicinity of Point Noire, Que., to Mile 8 on the Quebec, North Shore & Labrador Railway. Other work will include dredging for an ore loading dock, construction of a dock, rough grading of the service and ore storage area at the dock site, and construction of service facilities. The cost of this part of the project will be more than $15 million.

At Wabush Lake, Labrador, housing and other preliminary structures will be built at a cost of about $5 million.

The company's preliminary processing plant has shipped about 42,000 gross tons of high grade iron ore concentrates for sintering and blast furnace tests. Wabush Iron Co. is owned by Steel Co. of Canada Ltd., Youngstown Sheet & Tube Co., Interlake Iron Corp., Inland Steel Co., Pittsburgh Steel Co., and Pickands Mather & Co., the managing agent.

• **Alabama Project** — Engineering and geological studies of brown ore reserves near Eufaula, Barbour County, Alabama, are underway. Purpose: To determine whether it would be feasible to locate a steel plant in the area, says Gov. John Patterson of Alabama. Texas companies are reportedly interested in the project. One proposal would have the Barbour County Industrial Board issue revenue bonds to pay for construction of a $25 million to $50 million plant.

Lets Pipe Mill Contracts

National Supply Div., Armco Steel Corp., has awarded contracts covering buildings and some of the equipment for the multimillion dollar combination pipe mill at its Ambridge, Pa., plant. Contracts include: Armco Drainage & Metal Products Inc., Middletown, Ohio, fabrication and erection of buildings and crane ways; Ingalls Steel Construction Co., Verona, Pa., installation of roofing over the present crane runway and construction of an 80 ft extension to the runway; E. G. Smith Co., Emsworth, Pa., installation of the cranes.

Equipment suppliers include: Aetna-Standard Div., Blaw-Knox Co., Pittsburgh, cooling racks, rotary hot saw, and conveyors from hot saw to sizing mill and cooling racks; Sutton Engineering Co., Pittsburgh, two straighteners and inlet and outlet tables; Taylor-Wilson Mfg. Co., Pittsburgh, two, three head, automatic pipe testers; Yoder Co., Cleveland, 4¾ to 8⅞ in. electric resistance weld mill.

Designed primarily to produce continuous weld and electric resistance weld steel pipe (at speeds up to 2000 fpm), the new mill also can be used to stretch reduce seamless pipe to smaller sizes. Some operations are scheduled to begin this year. Full operation is scheduled to start July 5, 1962.

Will Build Oxygen Plant

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, will construct and operate an oxygen plant to supply Bethlehem Steel Co.'s blast furnaces at Johnstown, Pa. The $5 million plant will have a daily capacity of 675 tons of oxygen and is scheduled to be completed in September. For emergency needs, facilities will be built for the storage of 400 tons of liquid oxygen and 8 tons of high pressure gaseous oxygen.

Widens Metal Powder Line

Glidden Co., Cleveland, purchased the Metals Div. of Crane Co., Johnstown, Pa., to expand its operations in the metal powder field. The property will be operated as part of Glidden's Chemicals Div. Major products of the Johnstown operation are electrolytic and reduced iron powder and electrolytic vacuum melting stock. Other products include nickel, manganese, and silicon powders.

Bohn Aluminum Expanding

Bohn Aluminum & Brass Corp., Detroit, will expand facilities at its Adrian, Mich., plant for the production of brass rods and shapes, plus aluminum and brass forgings. The manufacturing operation will be moved from a plant in Hamtramck, Mich., to the new site. The project includes the purchase of manufacturing equipment.

Forms Automotive Div.

Minneapolis-Moline Co., Hopkins, Minn., established a Moline Automotive Div. It's under the direction of M. E. Carroll, vice president-marketing. Roger R. Hipwell has been appointed manager of the new division. George W. Balch is sales engineer. The division has a line of gasoline, LP gas, diesel, and natural gas engines; transmissions, torque converters, shuttle gears, axles, gearboxes, and related products.

Buys Plant in Youngstown

United Engineering & Foundry Co., Pittsburgh, purchased the Chrysler plant on Hezlep Street, Youngstown, from Chrysler Corp., Detroit. The buildings, covering about 5 acres of floor space, can be adapted to United's lighter manufacturing operations. Part of United's weld shop operations will be moved to the facility from the Phelps Street plant in Youngstown.

NEW PLANTS

SKF Industries Inc., Philadelphia, acquired a new plant in Asheville, N. C. The firm makes ball and roller bearings.

U. S. Steel Supply Div., U. S. Steel Corp., Chicago, officially opened its steel service center at 21st Street and Avenue C, Ensley, Ala. The new facility replaces two older structures in Birmingham. Equipment includes shearing, sawing, and flame cutting machinery and overhead cranes. The division stocks industrial steel products, steel strapping, strapping tools, and aluminum products.

Air Products Inc., Allentown, Pa., is building a manufacturing and distribution facility at the Valley Industrial Park, south of Minneapolis. A. V. Brenner is district manager of the operation which will supply oxygen, nitrogen, argon, acetylene, hydrogen, helium, medical gases, and a line of welding and cutting equipment.

Producto Machine Co., Bridgeport, Conn., is operating new facilities at 4639 Washington Blvd., Chicago 44, Ill., for production of special die sets. The plant is being operated in conjunction with Producto's Chicago distributor, Federal-Bryant Machinery Co.

CONSOLIDATIONS

Reeves Soundcraft Corp., Danbury, Conn., purchased **Alloy Surfaces Co.**, Wilmington, Del., developer of Alphatizing, a gaseous chromium diffusion process. Steel plates, dished heads, and fabricated chemical vessels of Alphatized steel are being produced on a development basis by Lukens Steel Co., Coatesville, Pa., says H. E. Reeves, president.

Cerro Corp., New York, will acquire the assets of **United Pacific Aluminum Corp.**, Los Angeles, subject to approval of stockholders.

Fairbanks, Morse & Co., Chicago, acquired a majority interest in **Disposable Hospital Products Inc.**, San Francisco, manufacturer of hypodermic syringes and needles.

Wilson Bros., New York, through its subsidiary, **Lawson Mfg. Co.**, New Kensington, Pa., purchased the **Everhot Heater Co.**, Detroit, from Temprite Products Corp., Birmingham, Mich. Everhot will operate as a division of Lawson with a new factory branch and complete facilities at Detroit. Clyde J. Bone is manager of the division, which makes glass lined water heaters.

NEW ADDRESSES

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., moved its branch sales office to 925 E. 38th St., Indianapolis, Ind. Reed Edwards is branch manager.

J. O. Ross Engineering Div., Midland-Ross Corp., New York, moved its branch office into larger quarters at 2909 Third Ave., Seattle 1, Wash. Paul Goldner is district sales manager of the division. It makes air processing equipment.

Unigage Corp. moved to 330 Interstate Rd., Addison, Ill. Ronald Thacher is president of the firm, manufacturer of precision gaging equipment.

Minneapolis-Honeywell Regulator Co., Minneapolis, moved its branch office to 1001 E. 55th St., Cleveland 3, Ohio.

NEW OFFICES

Besly-Welles Corp., South Beloit, Ill., opened a combination branch office and warehouse at 1150 E. Nine Mile Rd., Detroit, Mich.

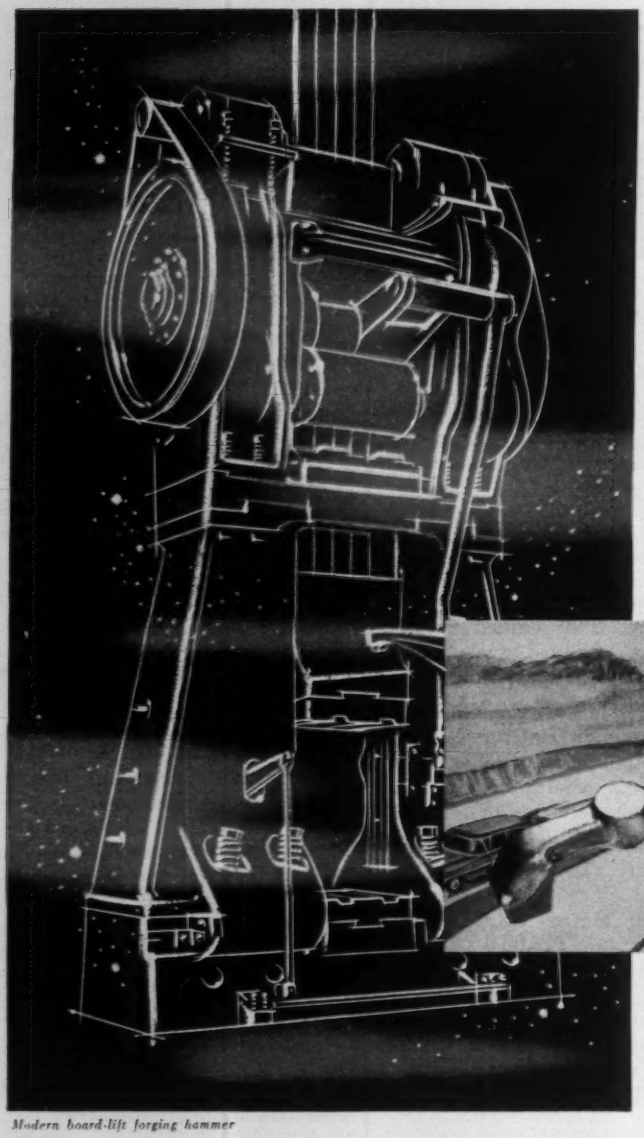
Caloric Appliance Corp., Topton, Pa., opened a Southeastern sales office for its Architectural Porcelain Enamel Div. at 912 Thayer Ave., Silver Spring, Md.

ASSOCIATIONS

American Society of Tool & Mfg. Engineers, Detroit, has become affiliated with the **American Association for the Advancement of Science**, Washington. The move emphasizes growing link between pure science and the engineering sciences. Dr. Harry Osborn, Ohio Crankshaft Co., Cleveland, will be ASTME's representative with AAAS.

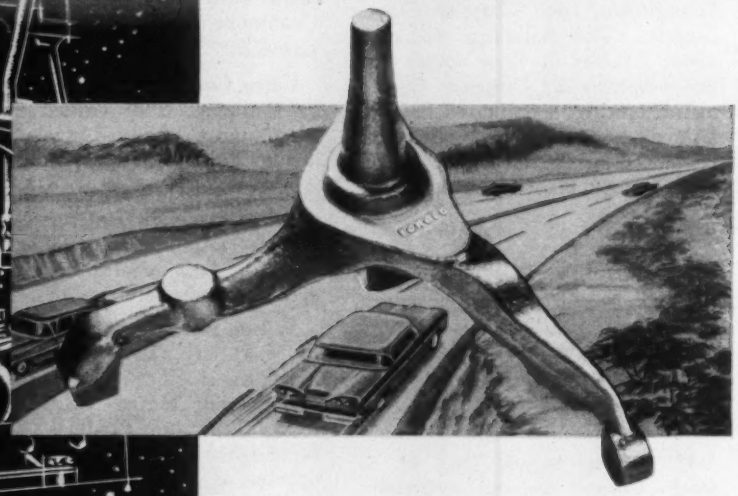
Leo E. Selig, J. Solotken & Co. Inc., Indianapolis, has been nominated for a second term as president of the **National Association of Secondary Material Industries Inc.**, New York. Four vice presidents also have been renominated: W. H. Daley, Independent Paper Stock Co., San Francisco; Theodore Gruen, International Minerals & Metals Corp., New York; Charles Rubenstein, Central Metal Co., Plainville, Conn.; and Bernard Schapiro, S. Schapiro & Sons Inc., Baltimore.

Steel Plate Fabricators Association, Chicago, elected these officers: President, E. G. Cole Jr., R. D. Cole Mfg. Co., Newnan, Ga.; vice president, A. L. Davis, Pennsylvania Engineering Corp., New Castle, Pa.; treasurer, F. E. Seery, General American Transportation Corp., Chicago; and secretary, J. Dwight Evans. Mr. Evans is also executive director of the association.



Modern board-lift forging hammer

SHOCK-STRENGTH of steering spindle soars by designing it to be forged



By designing front-end spindles to be forged, automobile and truck manufacturers practically eliminate danger of failure of these vital parts, even under sudden turning stress that can reach thousands of foot-pounds.

Start your designs by planning to use forgings everywhere there's a high degree of stress, vibration, shock, or wear. Forged parts withstand them all better than parts made by other fabrication methods. And forgings have no hidden voids to be uncovered after costly machining hours have been invested . . . the hammer blows or high pressures of the forging process compact the *better* forging metal, make it *even better.*

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine.

WATCH MISTAKES— To illustrate the high cost of making mistakes, C. G. Bauer, quality control director, Chrysler Corp., Detroit, points out that replacing a mismatched headliner (ceiling) in a car costs $23, ten times the original installation expense. It points up the importance of building, not inspecting, quality into products.

ROCKET ENGINE LAUNDRY— Aetron Div., Covina, Calif., Aerojet-General Corp., is building a 40 x 20 x 18 ft washing machine to remove dirt and acid residues from rocket engines after manufacture and test firing. The machine will employ special detergents and demineralized rinse water, and will have automatic cycles for prerinse, wash, rinse, and dry.

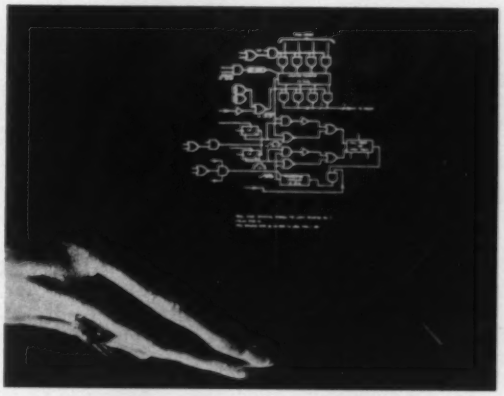
LOW COST HYDROGEN POWER?— International Telephone & Telegraph Corp., New York, says its scientists are working on a low cost method of continuously controlled, nuclear fusion of hydrogen for power purposes. "Experiments on controlled release are showing promise" is interpreted by some experts to mean they've broached the secret; others have adopted a "show me" attitude.

TITANIUM BRINGS SAVINGS— Use of titanium coils (expected to last indefinitely) in 45 heat exchangers is expected to save Saffran Engineering Co., St. Clair Shores, Mich., $50,000 a year. The titanium coils weigh 74 lb; coils formerly used weighed 1300 lb, had to be replaced every nine months. The equipment is employed in heating sulfuric acid to about 200° F. Titanium sheds corrosion products easily during tank cleaning.

TAPE TO TRIM AIRCRAFT WEIGHT— Some engineers at Boeing Airplane Co.'s Wichita, Kans., plant are hoping to be able to take 4 to 8 tons off the structure weight of a B-52G jet bomber by using numerical control to machine components. As an example of what they can do, they already have reduced a lower wing panel 21 lb over what it weighed when machined on template controlled machines. Programers of the numerically controlled equipment are telling machines to go in tight to nominal size—extra stock normally left by the cautious operator comes off as chips.

IMPROVED BEARING METAL— Bearing alloy made of aluminum (80 per cent) and tin (20 per cent) exhibits superior properties if it is continuously rather than chill cast, states D. A. Robins, chief metallurgist, Tin Research Institute, Columbus, Ohio.

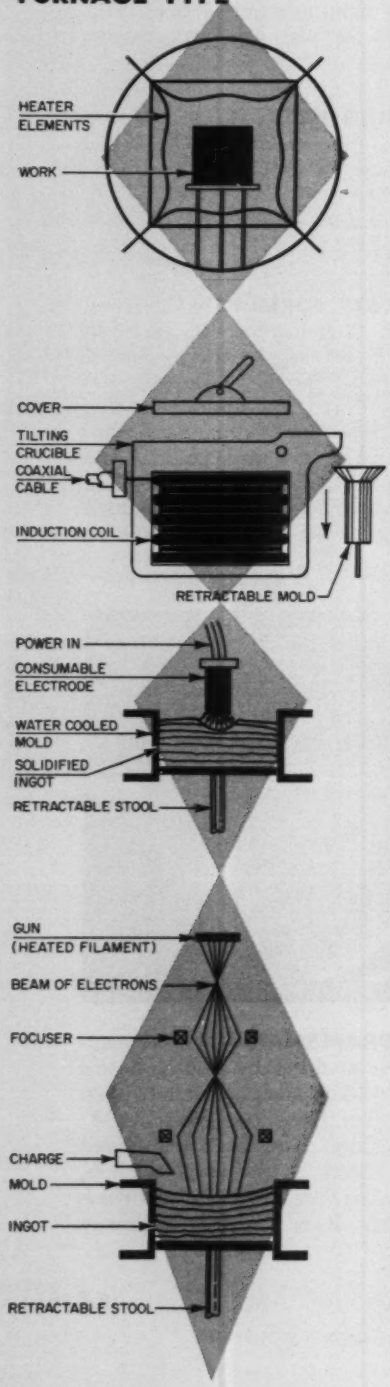
HIGH ENERGY RATE FORMING— Clearing Div., (Chicago) U. S. Industries Inc., now has exclusive right to make and sell a new line of high energy rate metal forming machinery developed by Hermes Corp., Pomona, Calif. The new machines are said to be faster, more compact, and less expensive than predecessors. The new line was developed by Hermes President J. B. Ottestadt, who, at 33, is a pioneer in high energy rate forming, having worked on Convair's Dynapak project.



SPLIT SECOND DRAFTSMAN— Complex engineering drawings are produced by electron beams in less than ½ second from computer information, says Stromberg-Carlson Div., San Diego, Calif., General Dynamics Corp. The firm's high speed microfilm recorder draws all the usual symbols, curves, and dimensions necessary to multiview mechanical drawing. It is expected to greatly reduce design time.

VACUUM FURNACES:

What They Are, What They Can Do

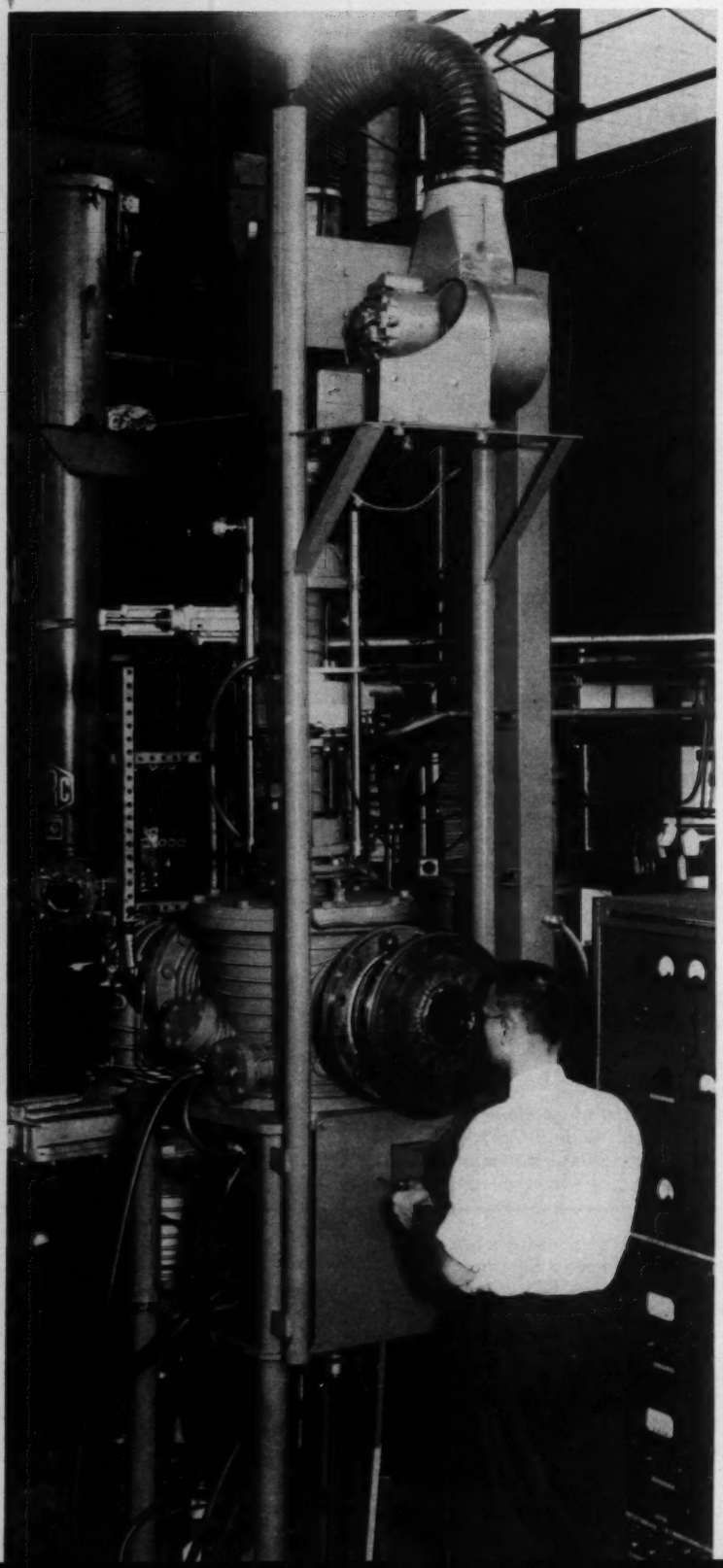


FURNACE TYPE		APPLICATIONS
RESISTANCE		
	Heating (below 2200°F)	Annealing, outgassing, brazing, sintering, heat treating.
	Heating (above 2200°F)	
INDUCTION		
	Melting	Melting, refining, and alloying of aluminum, copper, nickel, cobalt, steels, and other nonreactive metals and alloys. For casting of shapes and ingots.
	Heating	Annealing, outgassing, brazing, sintering, heat treating, and vacuum metals research.
ARC		
	Cold Mold and Skull	Production of ingots up to several feet in diameter with low gas content. Applicable to most metals—reactive and ferrous are of chief interest. Skull melting of refractory metals, scrap, sponge, compacted powders to make high purity cast parts.
ELECTRON BEAM		
	Melting	Melting and purifying reactive and other metals.
	Heating	Welding, evaporating, zone purifying, crystal growing, sintering, brazing, tensile testing, outgassing, high temperature studies, and microminiaturization processing. Machining.

Experts believe the benefits of vacuum technology are being overlooked by a large segment of industry. This story from NRC Equipment Corp., Newton, Mass., a producer of high vacuum equipment, will help you understand the fundamentals. It's in two parts. The first part (below) is a summary. The second part starts on the next page.

CAPACITY	ADVANTAGES	LIMITATIONS
Hot zones to 8 ft in diameter by 24 ft long.	Clean source of heat easily controlled; vertical or horizontal orientation. Uses conventional refractory insulated furnaces. Uniform temperature throughout. Inexpensive.	Temperature limited to 2200°F by strength of retort. Long heating and cooling times.
Hot zones to 6 ft in diameter and 6 ft long for temperatures up to 3000°F; to 2 ft cube for temperatures above 3000°F; 1 ft cube for 4500 to 5000°F.	Attains temperatures up to 5000°F at high vacuums. Fast heating and cooling due to low thermal inertia. Easily controlled. Absence of contamination from insulating materials or gases. Least expensive method of obtaining uniform temperatures of 3000 to 5000°F.	Temperature, vacuum limited by fragile metals in elements (Mo —3000°F; Ta—4400°F; W—5000°F.) Requires good vacuum, clean atmosphere. Temperature measurement difficult.
Up to 5000 lb of steel.	Can maintain metal at temperature for a prolonged period. Metal is stirred for continuous exposure to vacuum and homogeneity. Purification high. Alloying additions can be made with good composition control. Charge can be widely varied in size and shape.	Temperature limited by available crucible materials. Possible contamination of metal from crucible. Not applicable to reactive metals. Segregation problem with some alloys.
Hot zones to 2 ft in diameter and 3 ft long.	Simple design. Can heat load directly or indirectly. Rugged construction. Little thermal lag.	Vacuum limited by refractory insulation. Expensive.
Steel ingots up to 15 tons; titanium castings up to 2000 lb.	Lowest investment per ingot ton; largest ingot available. No crucible contamination. Can produce and hold large molten pool of refractory metal for either shape or ingot casting. Can be operated alternately with consumable and nonconsumable electrode. High melting rate. High yield.	Limited purification. Vacuum pumping conditions poor. Alloying additions difficult to make. Homogeneity hard to achieve. Barriers required for large furnaces handling reactive metals.
Reactive metal ingots up to 2000 lb. Larger ingots cast subsequently by consumable arc.	Capable of operating at extremely low pressures (below 10^{-4} mm mercury) to obtain high purification. No crucible contamination (cold mold process). Complete control of molten pool for best purification. Temperature limit high, and controlled by evaporation rate, not power or reaction. Wide flexibility in charge shape—saw chips, pellets, sponge, scrap, rods.	Generally must be operated at pressures below 10^{-5} mm mercury to maintain beam control. Presents problems with alloys of high vapor pressure constituents. Melting rate limited by gas content of charge.
Power levels 60,000 watts and higher available; charge size depends on temperature required. Tank size relatively unlimited.	Extremely high temperatures available. Wide range of control of heated zone from less than 0.01 in. diameter in welding to several inches in brazing, sintering, evaporating. Rapid heating possible with good control of heat zone. Processing at pressures below 10^{-4} mm mercury provides noncontaminating environment and generally purification occurs.	Work must be compatible with pressures below 10^{-4} mm mercury. Some problems in control of high temperatures.

What Vacuum Furnaces Can Do for You



IF YOUR metalworking manufacturing firm is medium or large in size, you will during the next decade examine closely and probably adopt one of the many vacuum techniques to improve some phase of your manufacturing process.

That's what John J. Chyle, director of research, A. O. Smith Corp., Milwaukee, tells STEEL. He feels that vacuum technology has great, untapped potential in brazing, heat treating, welding, diffusion bonding, refining, and many other areas.

A growing number of heat treating shops has already installed vacuum equipment to meet increasing demand for specialized work. Stainless steels, for example, annealed in a vacuum retain their bright finishes.

Vacuum furnaces are classified by the way they are heated—direct resistance, induction, arc, or electron beam. They differ considerably in applications, capacities, and usefulness.

Resistance

Such units fall into two classes: Muffle type, employed for brazing, heat treating, annealing, and removing gas from solid metals; and internal element type, primarily for sintering high temperature metals.

Costwise, the muffle furnace often is most economical for work below 2200° F. In addition, it provides uniform heating over a wide area and permits the work to be held at temperature as long as required.

The vacuumtight container or retort is usually made of stainless steel, Inconel, or some refractory material. The geometry of the workpiece determines whether the retort should be horizontal or in a vertical bell or pit.

Retort heat is supplied by an insulated, gas fired or electric resistance furnace. Conventional insulation gives off some gas, so it is seldom used inside a retort.

To speed cooling, some furnaces have cooling zones into which the work is moved. With bell type units, the furnace is often lifted so the retort can be air cooled or

sprayed with water. Inert gas can accelerate cooling.

Conventional metal retorts may collapse if heated above 1800° F, but that can be controlled by evacuating the space between an outer furnace shell and the retort (to 1 mm of mercury) to relieve most of the pressure differential.

Temperature limitations of retorts can be lifted by moving the heating elements inside the retort, by reflective insulation, by cooling the outer chamber with water, or by using element materials of molybdenum, tantalum, or tungsten.

Heaters in the internal element or "cold wall" design are often ribbons or rods arranged to form a split cylinder.

Graphite is frequently used to heat work not affected by carbon. The high temperature metals are costly and are somewhat limited in size by problems of fabrication and support, but they do permit temperature increases to 5000° F. An excellent example: A tantalum anode sintering furnace which operates at 4000° F in ½ cu ft spaces.

The hot zone is insulated by layers of heat reflective shields—the first few close to the heater are usually made of the same material as the heater. Refractory metals are susceptible to oxidation at high temperatures, so precautions must be taken to prevent accidental exposure when hot. Once evacuated, a furnace can be backfilled with inert gas.

Induction

The vacuum induction furnace is versatile. It plays a major role in metals research and provides the tool for large scale, high purification melting, heat treating, and high temperature sintering.

Melting furnaces range from 12 to 5000 lb in capacity and are heated by electricity at a high frequency. Advantages include: Thorough stirring; holding the work at melting or purification temperatures indefinitely to permit undesirable constituents to vaporize. Alloying constituents with high vapor pressures can be added at the last minute. (They might boil out if they are exposed to a complete heating cycle.)

Induction furnaces are limited by their crucibles which can't withstand intense heat because they react to charge materials. Above 2900° F, ferrous and nickel base alloys react with conventional crucibles. That is further aggravated by the stirring action of the induction field. It is considered impractical to melt reactive metals such as titanium, zirconium, columbium, and molybdenum in that way.

Rather than inductively heat a charge, you may find it's desirable to heat a susceptor sleeve which in turn heats the charge by radiation (mainly for heat treating and sintering). The susceptor must be a conductor like graphite or a refractory metal.

Arc

Arc furnaces have several advantages over resistance or induction melting units. They can be made economically in larger sizes—ingots weigh 30,000 lb or more. Since the melting is done in water cooled, copper molds, such furnaces permit production melting of reactive metals—tungsten, molybdenum, tantalum, titanium, and zirconium.

In the skull-arc furnace, the metal being melted solidifies between the molten bath and the water cooled crucible just as in the ingot furnace; but the molten pool of metal may then be tilt poured as in induction furnaces to cast ingots or shapes.

Arc furnaces are available in two styles: With nonconsumable electrodes (carbon and tungsten) or consumable electrodes (formed of the metal to be melted).

The nonconsumable process is severely limited by the low power levels needed to prolong electrode life. The electrodes deteriorate rapidly and inert gas under pressure is necessary to maintain a stable arc. Melting of sponge and scrap with a nonconsumable arc is achieved at partial vacuums on a small scale.

The consumable arc process overcomes some of those limitations but also introduces new ones of its own. You can maintain an arc at tank pressures down to 10^{-4} mm of mercury for good purification. Although the furnace is the best of all vacuum types for large sizes and high production, electrodes can be costly to form, particularly if they are fabricated by welding compacted sections. Heating occurs only during melting of the electrode, and it is impossible to maintain a molten pool of metal for extended periods.

Electron Beam

Newest of all vacuum techniques for heating and melting is the electron beam method. A charge of material is bombarded by a high velocity stream of electrons which heats the work on impact. The stream can be carefully controlled with appropriate focusing.

The emitter is an incandescent filament of tungsten or tantalum. Electrons are accelerated by a coil between the emitter and an anode which can be either an electrode or the work itself.

A water cooled mold equipped with a retractable stool keeps the molten metal at the top of the mold. A beam of electrons directed from a remote gun onto the surface of the melt does the work. New metal is added in pellet or chip form.

An alternate technique employs a ring type gun around the electrode. The same gun or a second one will keep the pool molten.

Furnaces with power outputs ranging from 60,000 to 300,000 watts are in use. Sizes up to 1.5 megawatts are being considered.

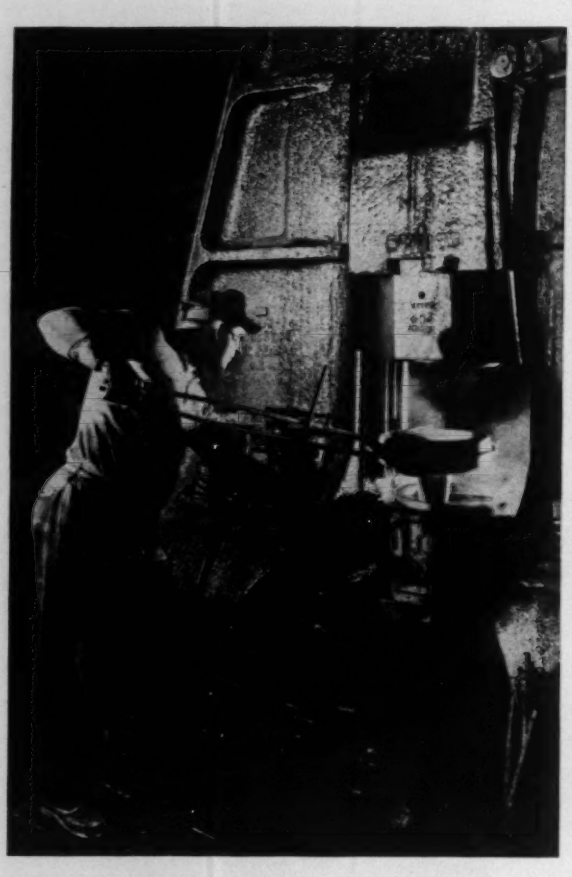
The electron beam is also coming into its own as a source of heat for welding, evaporating, brazing, sintering, and annealing. An intense, accurately focused beam delivers energy to a weld point. Available equipment can focus power (1000 watts) into a spot 0.01 to 0.03 in. in diameter. A vacuum higher than 10^{-4} mm of mercury is best. Evaporation techniques form thin films at ultrahigh vacuums (10^{-8} mm of mercury and higher) for microminiature electronics.

When applied to brazing, sintering, annealing, or zone refining, you can employ a defocused beam or the work can be used as the anode of an accelerating system for general bombardment.

That permits control of heat distribution on the work and permits extremely fast heating and cooling. Applications: Sintering of tantalum anodes for capacitors, brazing of small aircraft engine parts, zone refining of tungsten alloys.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Forging Firm Redesigns, Cuts Part



COST SAVINGS are the best measure of success for a cost reduction program, thinks Webb Forging Div., Jervis B. Webb Co., Detroit.

The function of each part being considered is first discussed by Webb Forging specialists in manufacturing, design, and engineering. Then it's up to the forging engineer to redesign a part so it is lighter, stronger, and costs less to make than competitive products.

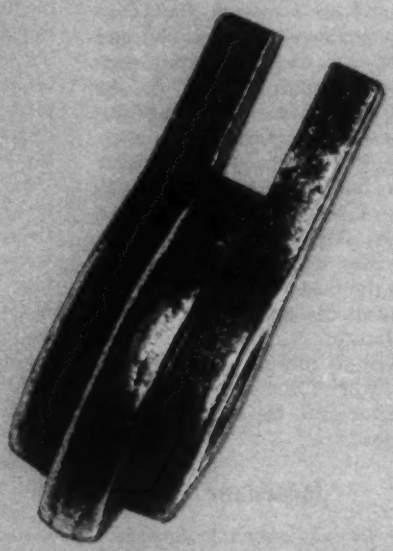
• To achieve the greatest cost savings, a forging firm must hold close tolerances, claims Webb Forging. Here are four essential points:

1. The steel must be heated thoroughly, quickly, and uniformly.
2. If contemporary die design is employed, all the metal will move with every blow of the hammer.
3. The parting line must be held constant.
4. The forging must be free of scale.

Here are three examples which illustrate results you can get from the suggested approach.

Clutch Hub

PROBLEM: Make from one piece instead of three.



• Example No. 1: The centrifugal clutch hub above is employed in a two cycle, chain saw engine. It acts as a center for centrifugal rollers which push against the clutch lining.

The part was formerly made from three components. The engine has forged crankshafts and connecting rods, so the maker suggested forged hubs.

In forging the hub, it is first coined for thickness (tolerance is plus or minus 0.005 in.) to eliminate draft. Coined edges also provide a smooth surface for the rollers.

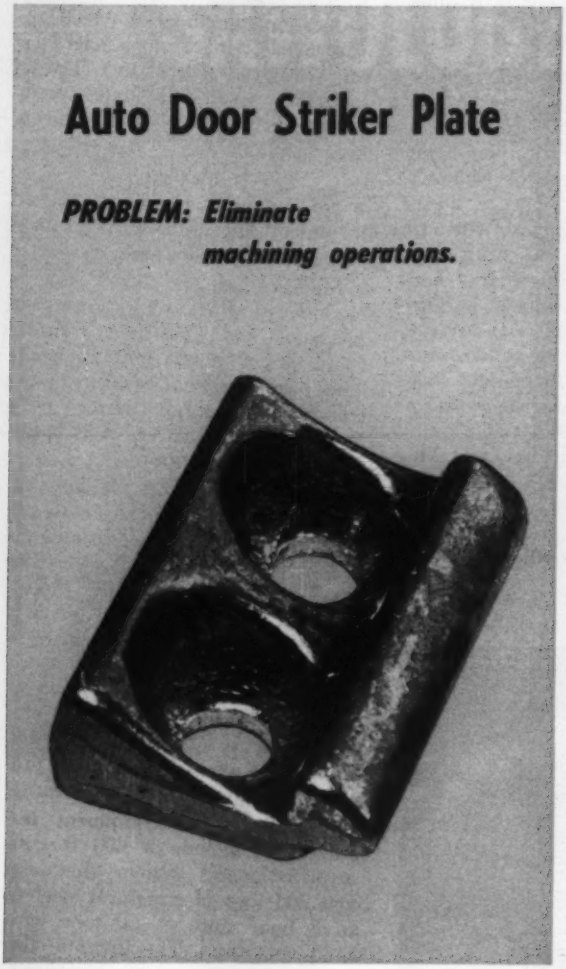
After forging, the part is drilled, reamed, and slotted in a screw machine.

The appearance of the part has been improved, says the enginemaker. All edges are smooth, and the part is made in one piece instead of three.

Costs 25%

Auto Door Striker Plate

PROBLEM: Eliminate machining operations.



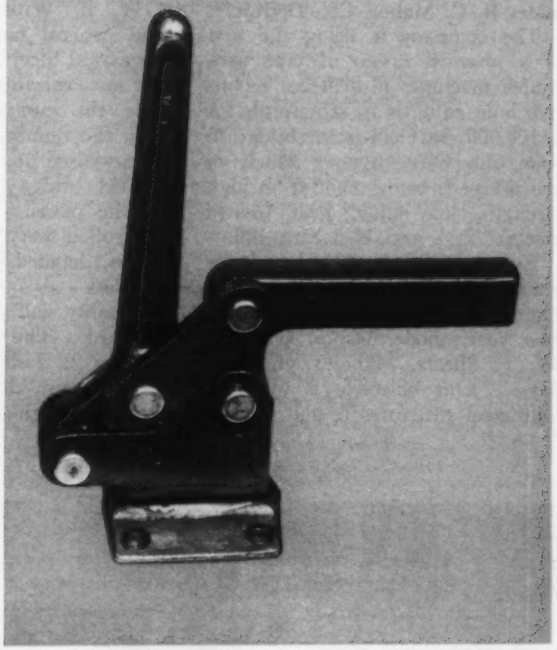
• Example No. 2: The automobile door striker plate above was originally designed for bar stock production. As a forging, it illustrates how it is possible for a designer to take advantage of some recent forging developments to eliminate several machining operations.

Radiuses and draft angles have been added. No machining is needed in some areas because tolerances are close enough, says one manufacturer.

Six parts are forged at once. Each is close trimmed to within 0.010 in. After cleaning, the two surfaces which mate and lock the door are coined to a 100 microinch (rms) surface finish. (Parts must not have imbedded scale in them.) At the same time, two countersinks (0.54 in. by 82 degrees) are coined into the part. Forgers punch 0.260 in. holes, after which parts are heat treated and zinc plated.

Industrial Clamp

PROBLEM: Make the clamp stronger without increasing size.



• Example No. 3: The maker of the industrial clamp above says he designed it for maximum stresses and held it to a practical and economical size although all applications could not be anticipated.

In this case, clamp, base, handle, and arm were made from flame cut SAE 1045, cold rolled steel. Each detail required hand grinding and heat treatment.

Forging people redesigned the handle to an I-beam section. Adding a generous radius to the arm and handle eliminated hand grinding.

The new base is a single forging coined in two planes —in one, the bottom draft was coined flat to eliminate machining; in the other, a step acts as a locating point for the side arm.

Holes are drilled in each component. Coining permits the holes to be pierced "free of extra charge." That upped machining production 100 per cent.

And heat treatment used to interfere with joining. The forgings don't require it because they are already strong enough as forged. On scalefree surfaces, shotblasting provides an adequate finish.

Tape Slashes Hole Costs on Structurals

DRILLING structural members on a tape controlled, beam and column machine should cost 85 per cent less than methods employing conventional layout, spacer punching, reaming, and radial drilling, estimates R. C. Mahon Co., Detroit.

The company is using the first of a planned group of tape controlled machines to drill out repetitive hole patterns in structurals for a 100,000 psi yield point bridge to span the Ohio River. Much of the bridge is being made from high strength, low alloy, heat treated steels, "T-1" and N-A-Xtra 100.

Explaining that the numerically controlled unit is the first such machine to be installed as part of a five year, modernization program, W. F. Sheetz, Mahon's president, says: "Our objective is to fabricate steel structures in the shortest possible time at the lowest possible cost."

• Numerical control will reduce the number of machines needed to turn out structurals.

W. E. Willard, vice president and general manager of Mahon's Structural Steel Div., says he hopes the modernization program will enable the company to drastically trim the number (now 63) of machines used to drill holes in fabricated bridge members. Already in the plans: Three other tape controlled machines to handle wide plates, detailed plates, and built-up sections.

Quality will go up too, says Mr. Willard. The machine, built by Walter P. Hill Inc., Detroit, can drill or gun drill ¾ in. diameter holes in high strength, low alloy steel at feeds up to 30 in. a minute to location tolerances of ±0.005 in. (previously, machining tolerances ran as high as ±0.125 in.). Tighter tolerances will eliminate costly bridge reaming operations during final assembly.

• No problems were encountered in integrating numerical control into Mahon's operation.

Mr. Willard told STEEL that a clerk was trained to program the machine, and that the training course lasted about half an hour. The programer has had no difficulty in getting hole pattern onto tape. Selection of feed and speed is left to the operator.

As for maintenance, Mahon assigned a qualified electrician to the crew from Hill during installation of the machine. He will now handle all normal machine maintenance. Local General Electric servicemen will handle maintenance on the GE Mark IV, four motion control, if special problems arise. Mr. Willard says they can get to the plant on short notice. Mahon has also set up routine preventive maintenance procedures.

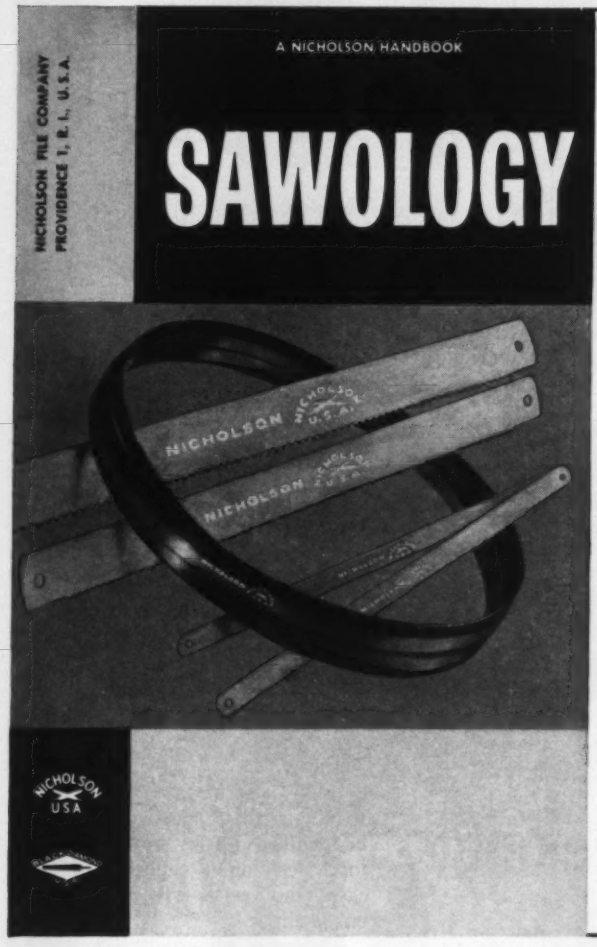
Other areas of equipment improvement include a 400 ft conveyorized paint system that can coat 200 tons of structural steel in an 8 hour shift vs. 50 tons with hand spraying. The division also installed high speed, automatic, submerged arcwelding units that Mr. Willard says are five times faster than former manual units.

Structural sections are loaded on a run-in conveyor. When the operator pushes a button, one section rides the beam feed conveyor into the machine, is clamped and drilled under tape control. When he pushes another button, the finished beam emerges onto the run-out conveyor. The machine has two, opposed, horizontal drilling heads and one vertical head. They can work on beams up to 80 ft long, 4 ft wide, and 4 ft high

Tape Course Completed

More than 500 machine tool salesmen and users have completed a course on numerical control offered by the American Machine Tool Distributors' Association. It covered the selection, justification, tooling, and programing of tape controlled machines. AMTDA reports that the response has been so good, extra sessions are being considered.

FREE FREE FREE FREE



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CONTENTS

Foreword	3
The "Genealogy" of Saws	4
The Making of Metal-Cutting Saw Blades	6
HAND HACKSAW BLADES	8
Hand Hacksaw Tooth Selector	10
Six Blade Types	10
How to Get the Most out of Hand Hacksaw Blades	12
Hints on Use and Care	14
POWER HACKSAW BLADES	15
Power Hacksaw Tooth Selector	16
Four Blade Types	16
Hints on Use and Care	18
BAND SAW BLADES	19
Four Blade Types	20
Friction Sawing	21
Contour Sawing	22
Hints on Use and Care	25
Band Saw Blade and Tooth Selectors	26
Notes and Quotes on Band Sawing	28
Questions and Answers	31

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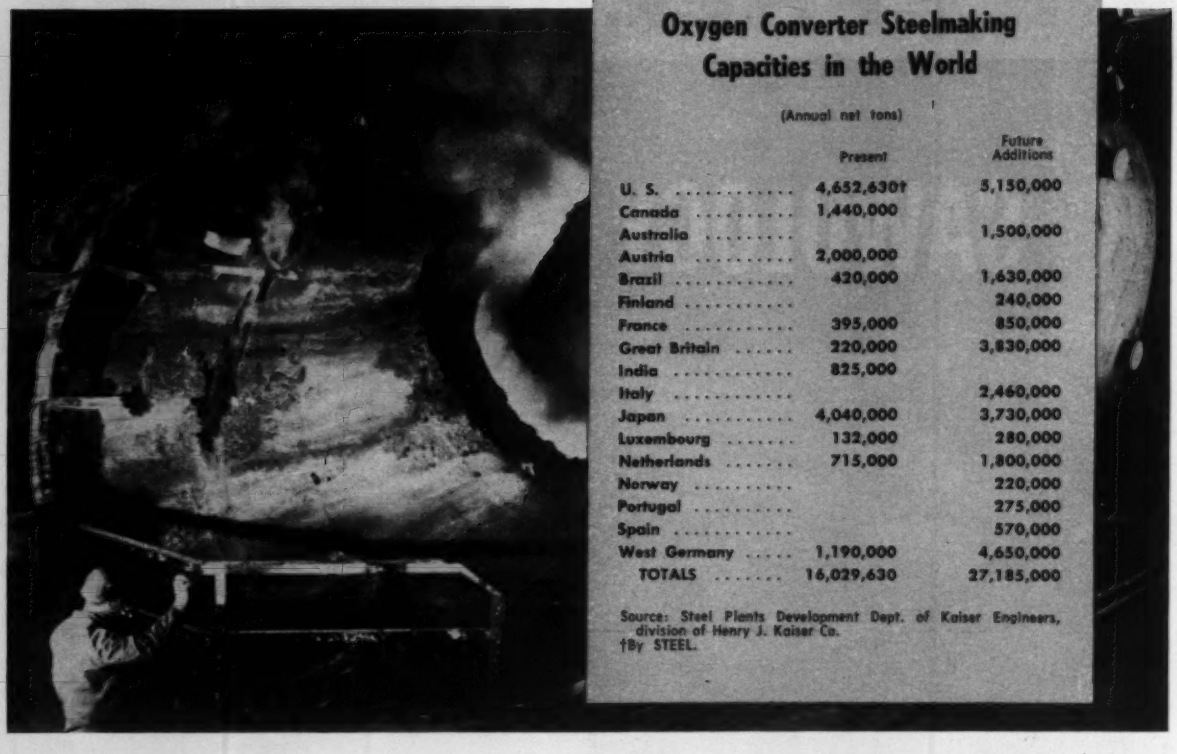


Oxygen Converter Steelmaking Capacities in the World

(Annual net tons)

	Present	Future Additions
U. S.	4,652,630†	5,150,000
Canada	1,440,000	
Australia		1,500,000
Austria	2,000,000	
Brazil	420,000	1,630,000
Finland		240,000
France	395,000	850,000
Great Britain	220,000	3,830,000
India	825,000	
Italy		2,460,000
Japan	4,040,000	3,730,000
Luxembourg	132,000	280,000
Netherlands	715,000	1,800,000
Norway		220,000
Portugal		275,000
Spain		570,000
West Germany	1,190,000	4,650,000
TOTALS	16,029,630	27,185,000

Source: Steel Plants Development Dept. of Kaiser Engineers, division of Henry J. Kaiser Co.
†By STEEL.

Basic Oxygen Steelmaking Capacity Leaps Ahead

CAPACITY to make steel in basic oxygen vessels (often called the L-D process) continues to grow. It will expand by 110 per cent in the next three years in the U. S. The rest of the world will have an increase of 193 per cent in the next four years.

A tabulation by the Steel Plants Development Dept. of Kaiser Engineers, a division of Henry J. Kaiser Co., Oakland, Calif., shows that by sometime in 1963 the U. S. will have added 5,150,000 annual net tons of basic oxygen furnace capacity.

The U. S. has total capacity of 4,652,630 tons now.

The Kaiser tabulation puts the increase over the next four years in the rest of the world at 22,035,000 net tons. Present annual capacity is 11,377,000 tons.

• Largest gains will be made by four countries, in this order: U. S., 5,150,000 tons; West Germany, 4,650,000 tons; Great Britain, 3,830,000 tons; and Japan, 3,730,000 tons.

After those additions, the capacities of the four countries will be: U. S., 9,802,630 tons; Japan, 7,770,000 tons; West Germany, 5,840,000 tons; and Great Britain, 4,050,000 tons.

Other countries which will make additions of more than 1 million net tons are: Italy, 2,460,000 tons; the Netherlands, 1,800,000 tons; Brazil, 1,630,000 tons; and Australia, 1,500,000 tons.

• Not all the new capacity can be chalked up as an increase of total steelmaking capacity. In some cases, the vessels will replace present facilities.

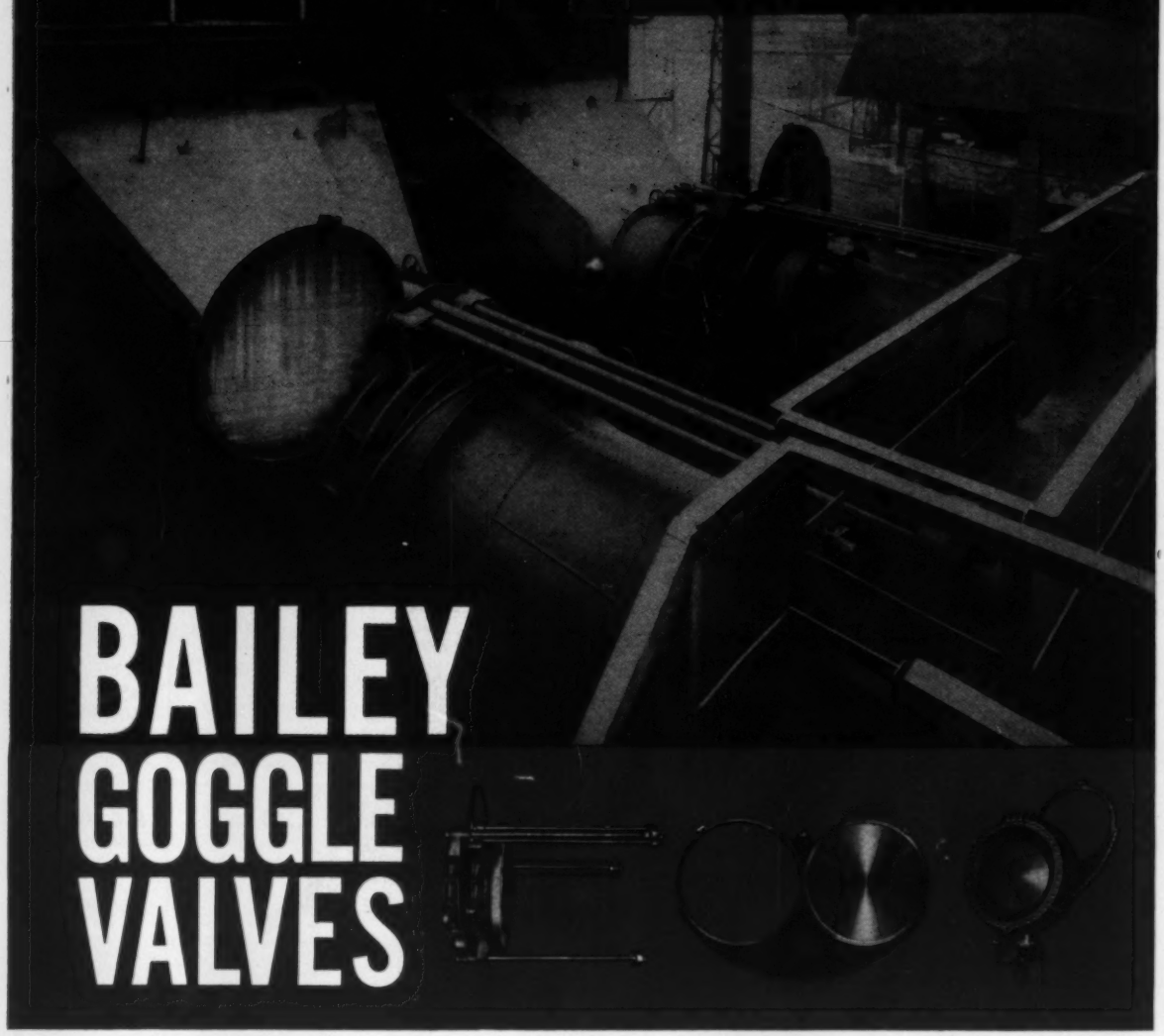
The trend here and abroad is toward bigger vessels. The largest ones will be in the U. S. Earliest vessels were well below 100 tons per heat. (The first vessels had a capacity of 35 tons per heat. They were installed at Linz and Donawitz, Austria, in 1952 and 1953.) Of the 120 vessels installed or to be installed, 35 have capacities of more than 100 tons per heat.

• The two units which Great Lakes Steel Corp. will put in at Ecorse, Mich., will be the biggest. Each will have a production capacity of 300 tons per heat. Jones & Laughlin Steel Corp.'s two vessels at Cleveland will have 200 tons of capacity each.

At Ecorse, Great Lakes Steel will have more basic oxygen furnace capacity than any other plant in the world. (Its annual capacity: 2,300,000 tons.) Second will be the Cleveland plant of J&L, but J&L (with

SURE CONTROL

FOR MORE THAN 1000 LARGE GAS MAINS



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Thermal Expansion Goggle Valve . . . Goggle Plate . . . Mechanical Goggle Valve

Widely used on blast furnaces, gas washers, precipitators and boiler plants, Bailey Goggle Valves assure safety and efficient service—regardless of the time they may remain unused.

These valves are made in two types: *Thermal Expansion,* which utilizes the linear expansion and contraction of steel for sealing and freeing the goggle plate (for 48″ to 120″ lines); *Mechanical,* on which a powerful clamping force is applied at all points around the disc periphery (for 6″ to 72″ lines).

• *Write for Bulletin.*

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Top Four Countries—Oxygen Converter Steelmaking Capacities

U. S.

Company	Plant Location	Start-Up Date	Annual Net Tons — Present	Annual Net Tons — Future Additions
Acme Steel Co.	Riverdale, Ill.	1959	452,000	
Colorado Fuel & Iron Corp.	Pueblo, Colo.	1961		1,000,000
Great Lakes Steel Corp.	Ecorse, Mich.	1962/63		2,300,000
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	1957	880,000	
Jones & Laughlin Steel Corp.	Cleveland	1961		1,850,000
Kaiser Steel Corp.	Fontana, Calif.	1958	1,440,000	
McLouth Steel Corp.	Trenton, Mich.	1954/58/60	1,880,630†	
		TOTAL	**4,652,630†**	**5,150,000**
JAPAN				
Amagasaki Steel Works Ltd.	Amagasaki	1960	440,000	
Fuji Iron & Steel Co. Ltd.	Hirohata	1961		660,000
Fuji Iron & Steel Co. Ltd.	Hirohata	1961/62		670,000
Nippon Kokan Kabushiki Kaisha	Kawasaki	1958	660,000	
Nippon Kokan Kabushiki Kaisha	Mizue	1960	880,000	
Sumitomo Metal Industries Ltd.	Kokura	1961		550,000
Sumitomo Metal Industries Ltd.	Wakayama	1962		550,000
Yawata Iron & Steel Co. Ltd.	Tobata	1959	650,000	
Yawata Iron & Steel Co. Ltd.	Tobata	1960	750,000	
Yawata Iron & Steel Co. Ltd.	Kukioka	1957	660,000	
Yawata Iron & Steel Co. Ltd.	Tobata II	1962		1,300,000
		TOTAL	**4,040,000**	**3,730,000**
WEST GERMANY				
August Thyssen-Huette A.G.	Duisburg-Hamborn	1962		1,000,000
Dillinger Huettenwerke	Dillingen, Saar	1960	270,000	
Dortmund-Hoerder Huettenunion A.G.	Dortmund	1962		1,500,000
Eisenwerk-Gesellschaft Maximilianshuette A.G.	Sulzbach-Rosenberg	1960	130,000	
Gussstahlwerk Bochumer Verein A.G.	Bochum	1957	470,000	
Gussstahlwerk Witten A.G.	Witten	1957	100,000	
Huettenwerk Ilsede-Peine A.G.	Peine	1962		450,000
Huettenwerk Rheinhausen A.G.	Rheinhausen	1961/62		600,000
Huettenwerk Salzgitter A.G.	Salzgitter-Druette	1961		550,000
Mannesmann-Huettenwerke A.G.	Huckingen	1960	220,000	
Phoenix-Rheinrohr A.G.	Duesseldorf	1961		550,000
		TOTAL	**1,190,000**	**4,650,000**
GREAT BRITAIN				
Colvilles Ltd. Ravenscraig Works	Glasgow, Scotland	1961/62		880,000
Consett Iron Co. Ltd.	Consett, England	1962		850,000
John Lysaght's Scunthorpe Works Ltd.	Scunthorpe, England	1962		450,000
Richard Thomas & Baldwins Ltd.	Ebbw Vale, England	1960	220,000	
Richard Thomas & Baldwins Ltd.	Newport, England	1962/63		1,650,000
		TOTAL	**220,000**	**3,830,000**

Source: Steel Plants Development Dept. of Kaiser Engineers, division of Henry J. Kaiser Co. †By STEEL.

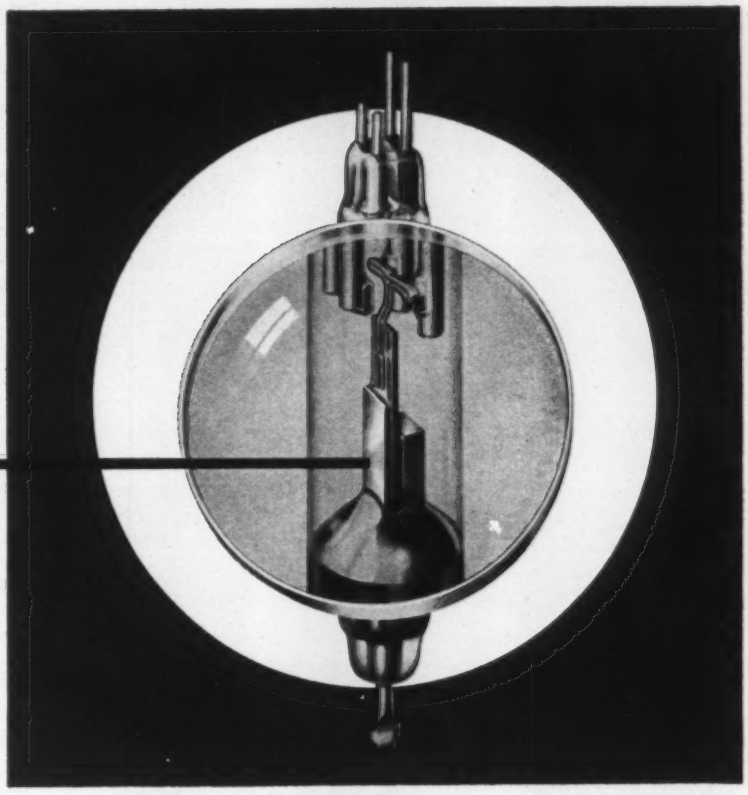
its Aliquippa, Pa., plant) will have more basic oxygen vessel capacity than any other company in the world. (Its annual capacity: 2,730,000 tons.)

Japan, whose steel producing capacity has almost doubled in the last five years, uses oxygen vessels to make about 20 per cent of its tonnage.

In the U. S., which has more total steelmaking capacity than any other country, basic oxygen furnaces represent around 3 per cent of the capacity.

BILLIONS OF BENDS

Prove SANDVIK SPRING STEEL'S *Fatigue Resistance*



Here is another example of the extraordinary fatigue life you can get from Sandvik Spring Steel.

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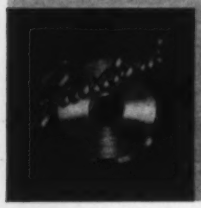

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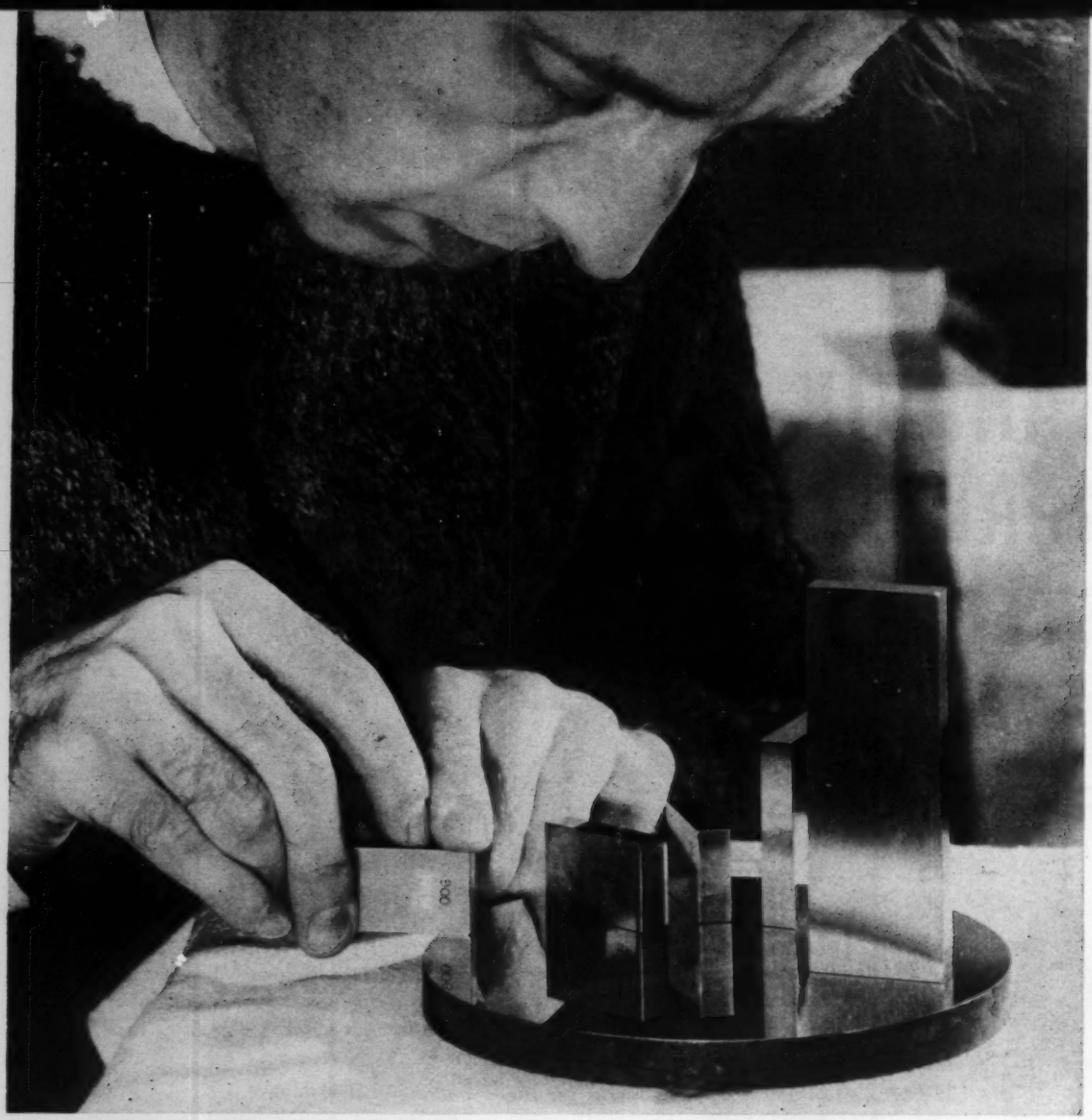
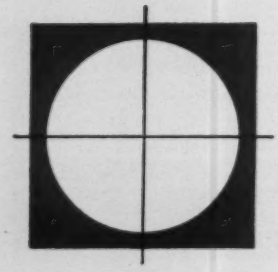


Wringing gage blocks to optical flat is one step in . . .

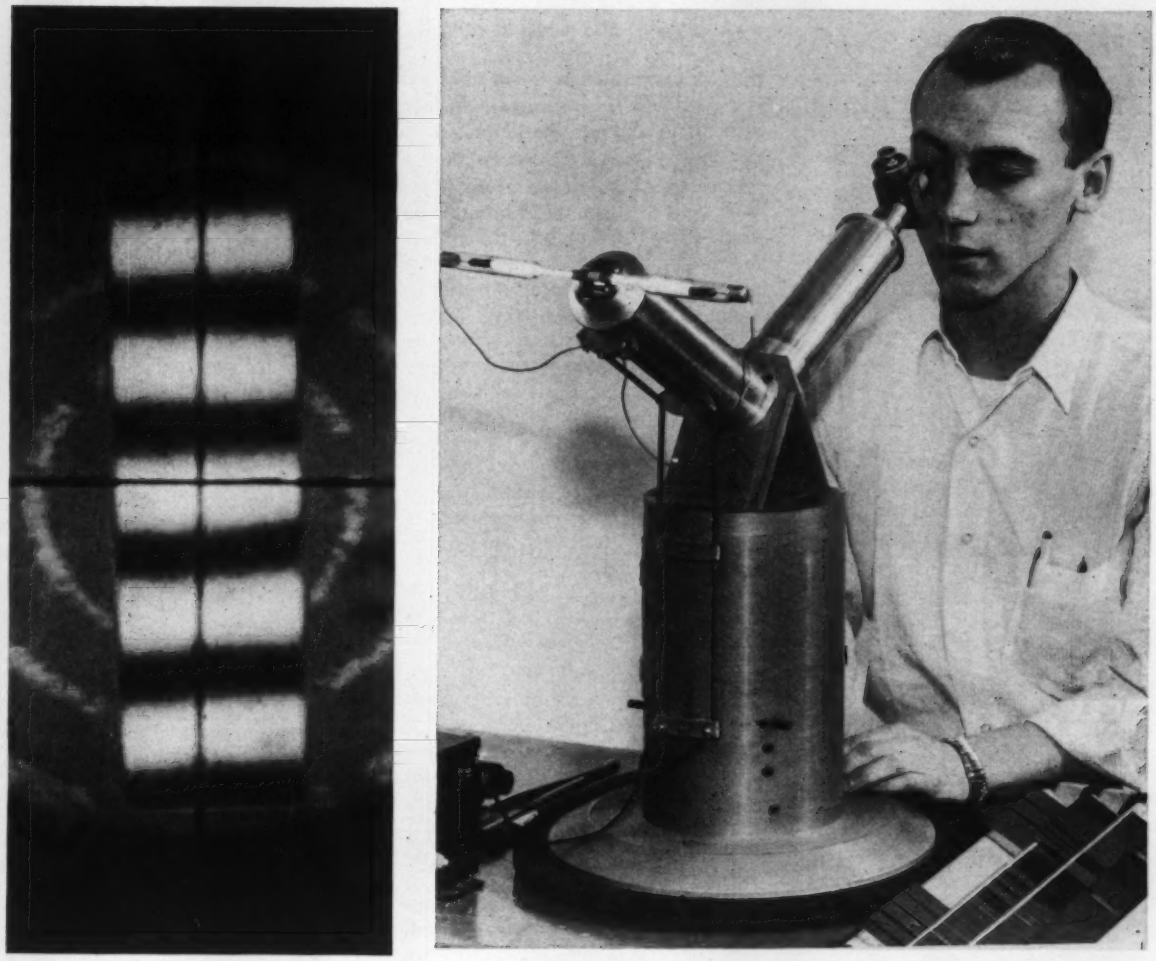
Setting the Standards of Industry



FINDING WAYS to meet the need for closer measurements will be a continuing problem for metalworking. Increasing industry's ability to make accurate determinations of dimensions equates to large savings in time and money.

Examples: Holding tolerances on bores and bearings to 10 microinches could cut the cost of large quantity production items from $950 to $250 per unit.

Two out of three units of an item that costs $25,000 to manufacture must be scrapped because of measurement limitations.



Interference patterns like that shown indicate a high degree of flatness for gage blocks; similar methods check parallelism (right) with monochromatic light

• Next target for gage blocks: Calibration to 1 part in 10 million.

Present routine determination limits at the National Bureau of Standards in the Department of Commerce are about 1 part per million on gage blocks. In special cases, 1 part in 5 million can be reached. On that basis, the bureau calibrates from 5000 to 6000 gage blocks a year, along with many other standards of measurement. Assistance is also furnished to others interested in metrology: Three volumes, dealing with the methods of precision measurement and the calibration of standards, based on papers prepared by the bureau, will be published early this year. They will be available through the Government Printing Office.

In trying for greater precision, the bureau says that adoption of the new wave length standard (see STEEL, Nov. 14, 1960, p. 111), and improvements in the equipment used in making measurements, offer the possibility of higher accuracy than presently attainable. The new international standard of length is not dependent on the meter bar comparison, but is defined by the number of wave lengths of light in the orange-red line of krypton 86. This standard can be reproduced readily, without physical comparison with a length standard.

• Improvements may come from entirely new methods.

Requirements for ultraprecise gaging, the Aerospace Industries Association told the bureau, "are reaching the limits of presently known methods of measurement." Present gage blocks show dimensional changes on aging, need to be recalibrated from time to time.

One approach may be the investigation of entirely new methods. The light standard of length is one such example. And research at the bureau is aimed at developing new alloys for gage blocks that would be stable enough to permit calibration to 1 part in 10 million.

• Gage blocks are a means of precise measurement in diverse fields.

The gaging surfaces on a gage block must be flat and parallel. The high surface finish on the block permits measurements by interference patterns of light (two light waves, opposite in phase, cancel each other), thus relating dimension to

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wave length. And when two blocks are "wrung" or twisted together, the thickness of the film between them is usually less than 1 microinch; it is difficult to separate the blocks.

Many laboratories maintain a master set of gage blocks which are used only to check the calibration of working sets. The blocks themselves are used to check the accuracy of micrometers, ring, plug and snap gages, the lead of screw thread gages, many types of indicating gages and comparators, and they are used with sine bars for accurate measurement of angles. Less usual applications include the calibration of precision barometers, and the construction of an electrical capacitor in which accurate measurement of dimensions permits the precise calculation of capacity.

• In checking gage blocks for calibration, they are first measured for flatness and parallelism.

Since surface irregularities would mean point to point differences in dimension, the degree of flatness, and the parallel alignment of the gaging surfaces is important. The maximum deviation permitted will depend on the grade of the blocks being measured. Grade A, or inspection quality, blocks can tolerate a greater variation than can Grade AA, or laboratory quality, blocks.

• Calibration of submitted blocks is against the National Bureau of Standards master blocks.

Electromechanical comparators show the difference between the block being tested and the master. Each block is compared at least twice. Tongs are used to handle the blocks to reduce variations in temperature; the test laboratory is maintained at a constant 68° F. The data from the comparators are fed, by means of punched cards, to a high speed, electronic computer which calculates the deviation of each block from its nominal length, and compares variation between values; if the spread is too high, the block must be recalibrated.

That test is adequate for the Grade A or inspection blocks, and a final report is prepared showing the nominal size, identification number, deviation from nominal length, and any excessive deviations in flatness and parallelism.

Correction

In the 1961 Forum on Technical Progress, STEEL, Jan. 2, p. 216, we inadvertently misquoted M. F. Garwood, chief engineer, materials, Chrysler Corp., Detroit, on the use of galvanized sheets in auto bodies. To set the record straight, Mr. Garwood says: "Although we are pleased with the excellent corrosion protection employed on Chrysler Corp. cars, we continuously examine alternate methods of protection. Preliminary tests of galvanized sheet metals have shown that no increase in the grade of drawing stock should be necessary. While tests are incomplete, we are hoping to avoid any upgrading so that galvanized costs may be kept in the same competitive range as other protective means."

• For Grade AA blocks, light waves are employed for comparison.

For these tests, the blocks must be free from burrs and in like-new condition. They are wrung to optical flats, then allowed to equalize in temperature.

When placed in the interferometer, the upper surfaces of the blocks and the surface of the optical flat become mirrors in the optical system. Two light sources are used, one from cadmium and one from mercury 198, and the fringes of light are a measurement of distance. Each band is equal to about 0.00001 in., and can be subdivided in practice to about 0.000001 in. Those precise measurements are corrected for air temperature, barometric pressure, and humidity, which affect the wave length of light in air. A correction is also applied for any deviation from 68° F.

The computer uses the results of the measurements to calculate the length of each block at 68° F. And the comparison with the optical and the electromechanical methods also serves as a check on the accuracy of the measurements and the values of the master gage blocks.

• The master blocks of the bureau are themselves calibrated against reference standards.

The light waves from cadmium

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These chromium-nickel analyses were developed to more closely match the exact requirements of process, nuclear, and space equipment. Each has one or more of the following advantages: increased corrosion and/or heat resistance, good machinability, ease of fabrication, and exceptionally high physical properties with low temperature heat treatment. By selecting the grade that gives you the combination of advantages you want, your costs can be reduced and the trouble-free life of your equipment extended.

Write today for details on these superior grades and for inventory information on all types of stainless steel plates and heads.

*Trade marks of Armco Steel Corporation

C

G.O.CARLSON Inc.

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122 Marshalton Road
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MEEHANITE® MEANS BETTER CASTINGS

By W. H. MOORE
Vice President
Meehanite Metal Corp.

What you should know about Meehanite Metal

WHY THERE IS NO EQUIVALENT

How many times have you been told "I can give you something just as good as Meehanite® and at a lower price" only to find that the castings did not meet your standard of quality.

Actually there is no equivalent for Meehanite metal. Here's why: The exclusive Meehanite process makes use of 32 patented procedures that are essential to the production of highest quality castings and which can be used only by bonafide Meehanite licensees. These procedures relate to all phases of manufacture including processing agents, melting furnaces, sand control, and molding to insure the integrity exhibited by every Meehanite casting. More than 200 Meehanite foundries throughout the world prove the validity of these techniques and share in 35 years of technological know-how that truly puts Meehanite metal in a class by itself.

The production of Meehanite® involves a lengthy training period under the direction of Meehanite engineers, and a continuing program of metallurgical help and advice. Set standards of operation enable Meehanite foundry-men to apply structural control to castings on a day by day basis.

Essentially, the metallurgical control in the production of Meehanite castings involves obtaining a balance between undercooling produced in the melting operation and nucleation produced by processing the molten metal with alkaline earth agents. The initial degree of undercooling is related to the mass of the casting to be poured and the density and physical properties required. This is then modified by nucleation to force deposition of graphite at exactly the right time during solidification so as to give the right size and shape and distribution to the free graphite at the same time maintaining the character of the metallic matrix. The net result is predictable properties and uniform structure in every section of a casting and from casting to casting.

Gray cast iron made to a chemical specification without benefit of controlled undercooling is influenced by mass effect to a maximum degree and for this and other reasons cannot be considered an equivalent to Meehanite.

There are more than 26 different types of Meehanite metal available, each of which is specifically designed for a given set of service conditions.

Accept no substitute for Meehanite quality and performance. Specify Meehanite castings and be sure. For more information about Meehanite castings and the foundries making them, write to: *Meehanite Metal Corporation, 714 North Avenue, New Rochelle, New York.*

MEEHANITE METAL

Meehanite Castings Are Made Only By Meehanite Foundries

and from mercury 198 are used to check the master blocks. A count is made of the number of fringes from the optical flat to the outer surface of a block wrung to it, to calculate the precise length of the master block. The reference standards, in turn, have been compared accurately with the new international standard.

Recalibration of the master blocks is necessary because of dimensional changes with age, beyond any changes due to wear; industrial master blocks may need checking as often as once a year.

• **Quality of the gage block determines the accuracy of the calibration.**

Blocks up to 0.090 in. are calibrated to ±3 microinches. In the range 0.100 to 2 in., Grade A blocks are calibrated to ±4 microinches, Grade AA to ±2. Larger blocks add 1 microinch in tolerance for each inch in length.

Charges made by the bureau for the calibration services depend on the number of blocks submitted and the precision required.

Higher accuracies than those listed can be obtained, the bureau reports, if special arrangements are made—and if the quality of the gage block permits.

Modernization of Press Improves Hot Extrusions

Modernization of a 2750 ton Loewy Hydropress at Scovill Mfg. Co.'s Rod & Wire Mills, Waterbury, Conn., has provided substantially higher capacity and greater precision control over the entire hot extrusion process.

Scovill says capabilities have been extended to better mill products and experimentation with the newer exotic metals and alloys.

The new press setup can handle billets 10 in. in diameter, 32 in. long, weighing up to 750 lb.

Previous capacity: 8 in. diameters, 32 in. lengths, and weights to 455 lb.

The extrusion press is served by a new design of automatic walking beam type, billet heating furnace made by Surface Combustion Corp., Toledo, Ohio.

Tape Controls Depth of Cut on Turret Drills

AUTOMATIC tape control of depth of cut of each spindle, rapid traverse length, and selection of feeds and speeds are optional features now available on Burgmaster six and eight spindle, tape controlled, turret drilling units.

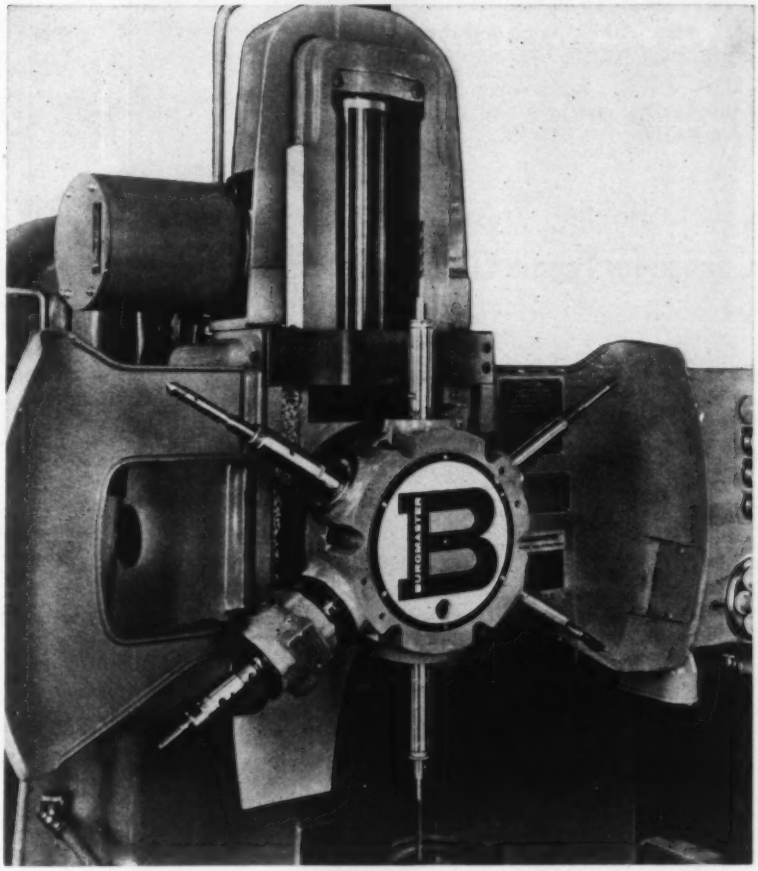
A three axis, tape control system provides automatic machining with X-Y axis table positioning, and simultaneous Z axis control of tool penetration to suit the individual operation of each spindle.

The design permits job setups to be made faster by eliminating manual presetting of mechanical depth stops. By programing the rapid approach length and depth of each cut into the punched tape, the same spindle can be used to automatically machine holes of varying depths at different work positions.

The automatic depth control feature must be specified when ordering. General Electric, Hughes, Warner & Swasey, Westinghouse, Bendix, Rheem, Sperry, and Norden units are among those available.

In the design shown, a GE three axis system is used.

For further information, *write* Burg Tool Mfg. Co. Inc., 15001 S. Figueroa St., Gardena, Calif.

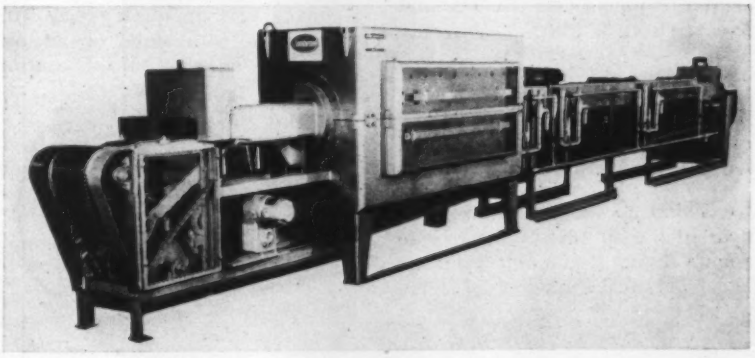


Alloy Muffle Featured on Conveyor Furnace

TYPES of jobs suggested for this electrically heated, conveyor muffle furnace: Atmosphere controlled, continuous, copper brazing and annealing, or bright hardening of stainless steel parts.

The unit has an alloy muffle and is ready to operate as soon as working temperature is reached—even after a weekend shutdown, the company claims.

Special radiation shields at each end of the heating chamber reduce



radiant heat loss. Thermostatic controls in the cooling chamber keep water consumption at a minimum.

The furnace is built in five sizes with heating chamber dimensions from 36 x 4 x 2 in. to 72 x 12 x 4 in. It can produce 30 to 180 lb of work per hour. Maximum operating temperature is 2100° F.

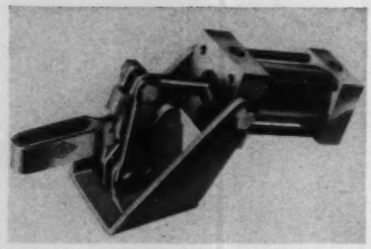
For further information, *write* Sunbeam Equipment Corp., Meadville, Pa.

450 lb Holding Pressure Claimed for Toggle Clamps

OVERCENTER toggle locks that eliminate bounce or recoil are featured on a series of air or hydraulic toggle clamps.

They can be used individually, in series, sequentially, or simultaneously. The clamps have holding pressure up to 450 lb at 80 psi line pressure.

Each of the three models weighs 26 ounces. Precision pivot pins



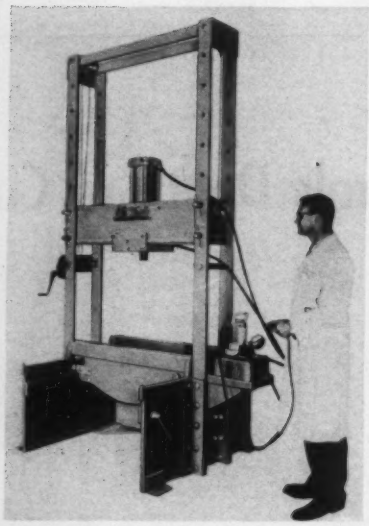
matched to burnished holes insure long, accurate operation. Model 807-L has a solid bar, is equipped with a spindle retainer. Model 807-U has a standard U-Bar, Model 807-UL a long U-Bar.

For further information, *write* Detroit Stamping Co., 330 Midland Ave., Detroit 3, Mich.

Hydraulic Shop Presses Rated at 50, 100 Tons

RUGGED, 50 and 100 ton, roll bed, hydraulic shop presses incorporate double acting, heavy duty cylinders and high speed, two stage pumping units.

The roll bed feature permits safe,



easy loading and unloading of hard to handle work outside the press frame. The crosshead is vertically adjustable and the cylinder work head is horizontally adjustable.

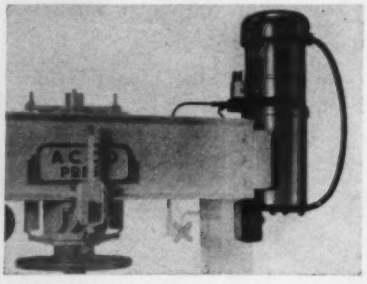
The hydraulic cylinders can operate at pressures up to 10,000 psi. Stroke length can be specified. A two stage, hydraulic pumping unit speeds ram approach and return. Accessories and controls are available.

For further information, *write* Owatonna Tool Co., 398 Cedar St., Owatonna, Minn.

Unit Converts Presses To Electrical Operations

AN ELECTRIC drive conversion unit makes it possible to convert the manual or air driven Acco or Manley hydraulic press to electrical operation. Benefits are promised press users who require easy control and quick response.

An easily operated needle valve provides stepless speed control. The company says approach speeds are comparable with those of an air drive and response to the control



valve under load is almost as fast as the conventional electric drive. All components for conversion are supplied except power cable. The company says the E-110 electric conversion unit can also be mounted on any hydraulic press that has an external high pressure line.

For further information, *write* Acco Equipment Div., American Chain & Cable Co. Inc., York Pa.

Use of Rod Ends Solves Misalignment Problems

LARGE size rod ends, control rod assemblies, and high angle rod ends with studs are suggested for linkage systems where misalignment must be accommodated. Construction features permit sustained rotational operation.

For further information, *write* Split Ballbearing Div., Miniature Precision Bearings Inc., Lebanon, N. H.

Internal Depth Stop Attached to Drill Press

DESIGN of a 17 in. drill press line includes a new, internal, depth stop which permits stopping of the pinion at any preset depth within the full 5 in. spindle travel range. A depth gage, calibrated down to 1/16 in. and magnified 2:1 for easy reading, is attached.

The manufacturer claims the depth stops eliminate quill, spindle, and cutting tool deflection. The setup also eliminates stopnuts.

A choice of 84 model variations is offered to cover a wide range

NEW PRODUCTS and equipment

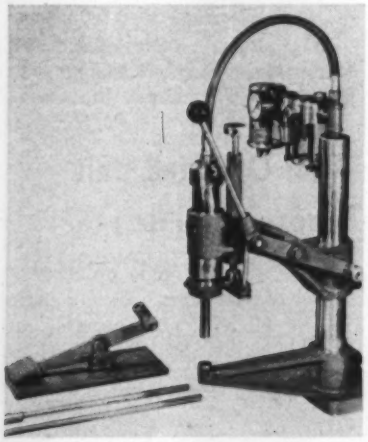
of job requirements. Included are single spindle, floor and bench models; multiple spindle units; and drill heads with hand or power feed. They can be used in both high and low speed operations.

For further information, *write* Dept. 1017, Walker-Turner Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

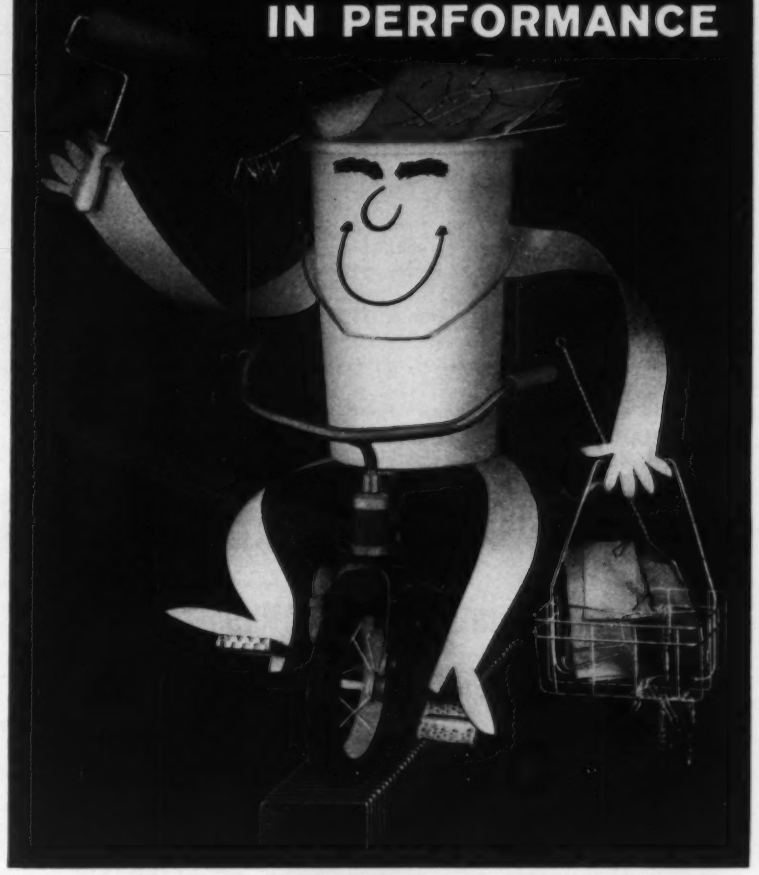
Tool Pressure Triggers Repeating Air Hammer

INTERNAL VALVING with no outside valve or trigger is featured on the Model 150-RHP-090, repeating air hammer. Actuation is by tool contact pressure on the work.

The rate varies from 3000 to 6000 times a minute depending on the air pressure used. The action can



CONTINENTAL® WIRE PUTS THE "FORM" IN PERFORMANCE

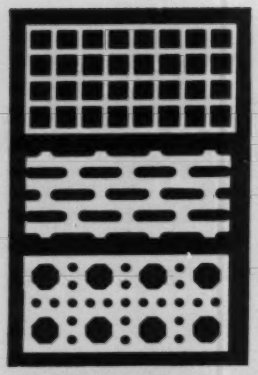


Formability that permits difficult twists and bends . . . sustained fast production in coil after coil . . . smooth tight coatings that do not powder, flake or peel to jam machines. Such wire calls for consistent, uniform quality. You can get it at Continental, in sizes and finishes to meet most specifications—from 7/16" on down to 40 gauge, in various tempers and analyses, in low and medium low carbon steels. Special shapes, too. Why not let our mill technicians work with you on any problems you may have pertaining to wire fabrication. We may have the answer to a particular need. Write today for your FREE copy of our new wire manual.

Wire Specialists for over half a century

CONTINENTAL STEEL CORPORATION KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized; KOKOTE, Flame Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.



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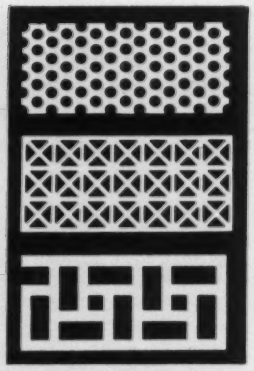
MONEY-SAVING
ANSWER
to
Many Production Problems



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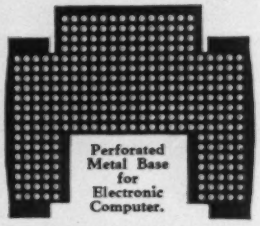
Sheets • Plates • Panels • Fabricated Parts

For nearly half a century we have supplied America's largest industrial organizations with perforated metal products of all kinds; in lots to meet their production schedules. This procedure not only reduces their inventory costs but, usually, also assures other substantial savings because of our special facilities for producing this type of work efficiently and economically.

Send us YOUR blue prints and specifications. Our experienced engineers are often able to make cost-cutting suggestions without charge or obligation.



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We fabricate special panels or parts to any desired extent. Illustrated Catalog on request.

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LET UNIVERSAL SUPPLY AND GRIND IT

Eliminate double purchasing and re-handling bar stock for precision finished straight shafting. Universal's quote on stock and finish will delight you . . . and there's *no* delay.

Materials — Mild Steel, Alloys, Non-Ferrous.
Finish — To 5-micron.

Ask for Universal's illustrated catalog file covering 14 grinding operations that can save you time and money.

UNIVERSAL GRINDING
CORPORATION
2200 Scranton Rd., Cleveland 13, Ohio

NEW PRODUCTS and equipment

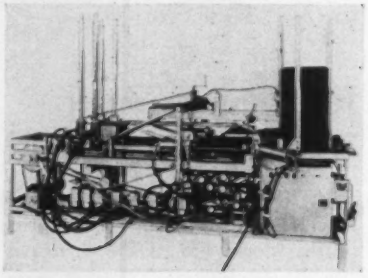
be regulated from a gentle vibration to a riveting capacity of 1/8 in. in mild steel. An adjustable depth stop permits limiting work progress. When the designed depth is reached, the hammer action fades out. The tool is keyed against rotation and is held in place by the spring loaded key.

Suggested applications include riveting, staking, inserting bushings and bearings, part assembling, and working and shaping sheet metal.

For further information, *write* Heindrich-Nourse Co., 631 E. Third St., Los Angeles 13, Calif.

Automatic Machine Staples Up to 1000 Cartons an Hour

FEATURES of an automatic stapling machine include complete automatic setup of full and partial overlap knockdown cartons, an opener, and a positioner for loading merchandise into cartons.



The unit is also equipped with automatic flap closers and staple closure mechanisms. Adjustments can be made for a wide range of cartons. Production rates range 400 to 1000 per hour.

For further information, *write* International Staple & Machine Co., P. O. Box 270, Herrin, Ill.

Hand Operated Unit Bends 2 in. Pipe

EXTRA HEAVY pipe up to 2 in., or heavy wall tubes, can be handled by the Model 2 HO, portable ram bender, which has full power return.

It develops 8 tons of thrust at 6000 psi. Open type wingheads

provide fully visible bending, freedom from obstructions, speedier handling, and easier access for cleaning and maintenance. The unit is also available with tube and flat bar dies.

For further information, *write* Wallace Supplies Mfg. Co., 1304 W. Diversey Parkway, Chicago 14, Ill.

Latex Base Coating Resists Alkalies, Acids

FANS and blowers, duct systems, tank cars, trailers, storage tanks, pipes, fittings, and industrial equipment can be protected from acids and alkalies by application of a latex base coating (Herecrol RC-31).

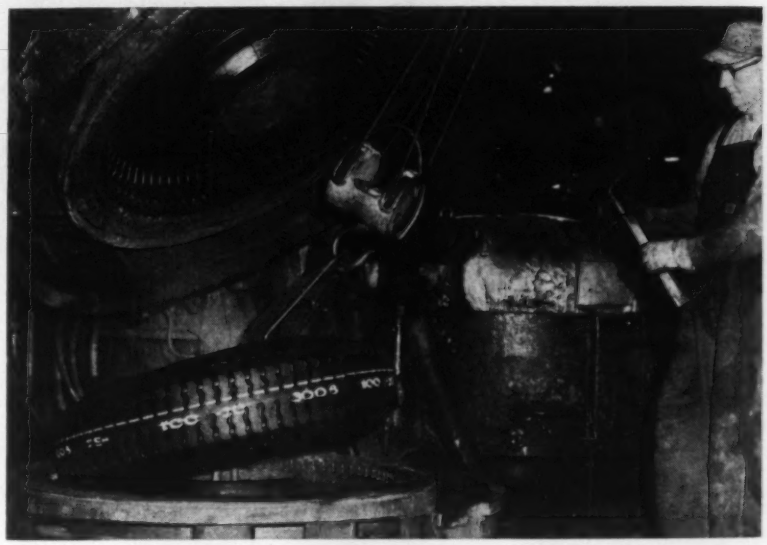
The material is a pigmented (gray or white), synthetic rubber with toughness, resilience, and flexibility, as well as corrosion resistance. Excellent resistance is reported against sodium hydroxide, ammonium hydroxide, and potassium hydroxide. The material is shipped in 5 gallon open top pails.

For further information, *write* Heresite & Chemical Co., Manitowoc, Wis., or Woodbridge, N. J.

Hinged Steel Belting Cuts Conveyor Frame Depth

A SHORT pitch link that permits a considerable reduction in section depth of conveyor design is featured in a line of heavy gage, hinged steel, conveyor belting. The design is

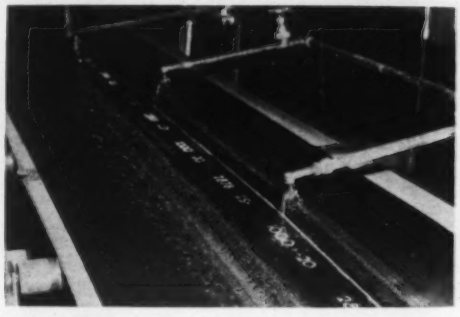
PANNIER MASTER MARKING SURVIVES WATER, HEAT, PRESSURE IN FIRESTONE TIRE MANUFACTURE



(top) A cured tire being pulled from a tire mold at Firestone Tire & Rubber Co., Akron. The Pannier code markings are still clear after having undergone water washing, and the heat and pressure of molding.

(right) The Pannier Code Printer rolls continuously on the moving tread extrusion, providing clear, unsmudged marking of tire size, stock code, shift and date. Code printer characters are quickly and easily changed. A wide range of type size is available; special characters or trade marks can be obtained.

(right) Pannier marking is immune to the effects of the dash of cooling water that pours over the hot extrusion. Pannier marking inks are scientifically formulated for each specific use and physical factor.



Whatever the industry, whatever the marking requirement – printing, stamping, embossing, stenciling, branding, Pannier has the techniques and proven equipment to do the job. Pannier engineers will be glad to consult with you without obligation.

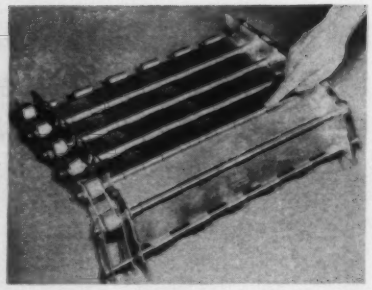
PANNIER MASTER MARKERS

382 Pannier Bldg., Pittsburgh 12, Pa.

compatible with existing conveyors using hinged steel belting, buyers are assured.

The belting is made from steel 1/8 in. thick. Each length has a 2 1/4 in. pitch that allows the assembled belt to run on sprockets with a pitch diameter as small as 5 in. Conveyor depth can be as little as 8 1/2 in.

Belting can be supplied in any practical width.



Individual links are produced in widths up to 18 in. Wider belting can be made up by threading multiple links on the through rods. The manufacturer suggests that nuts, bolts, stampings, castings, and other items which are heavy but not bulky can be handled. Increased clearance between throughholes and throughpins on the links can be specified; that is regarded as advantageous when corrosive action is present. Belting is available in other materials.

For further information, *write* May-Fran Mfg. Co., 1710 Clarkstone Rd., Cleveland 12, Ohio.

High Speed Chain Drives Rated from 30 to 1800 hp

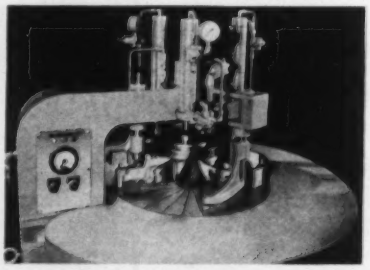
CHAIN DRIVES called Hy-Vo have been developed by Morse Chain to fill the power transmission gap between low speed roller chain and high speed gearing. The drives can transmit 30 to 1800 hp. They are applicable to main or auxiliary drives and are capable of transmitting rotating power between parallel shafts at high speed. A suggested application: Transmitting power of small gas turbine engines.

For further information, *write* Morse Chain Co., Ithaca, N. Y.

System on Lapping Unit Maintains Abrasive Mix

A FEATURE of the Model 24, Lapmaster, lapping unit is the abrasive distribution system which maintains the correct mixture of compound to vehicle from initial filling to the last drop.

It provides adjustable flow control and, through pressure pumping at a constant head, assures uniform deposit at the lapping stations. The unit will lap parts of almost any shape, form, or material on a production basis within tolerances of 1 light band or less and uniform



RA 330® brings the space age **CLOSER**

RA 330 supports rocket cases in pit furnace 10 ft. diameter by 30 ft. deep.

RA 330 provides strength at 1900° F. to support, without fear of dropping, a 3500 pound load; resistance to thermal shock of rapid heating and air quenching; resistance to furnace atmosphere and oxidation.

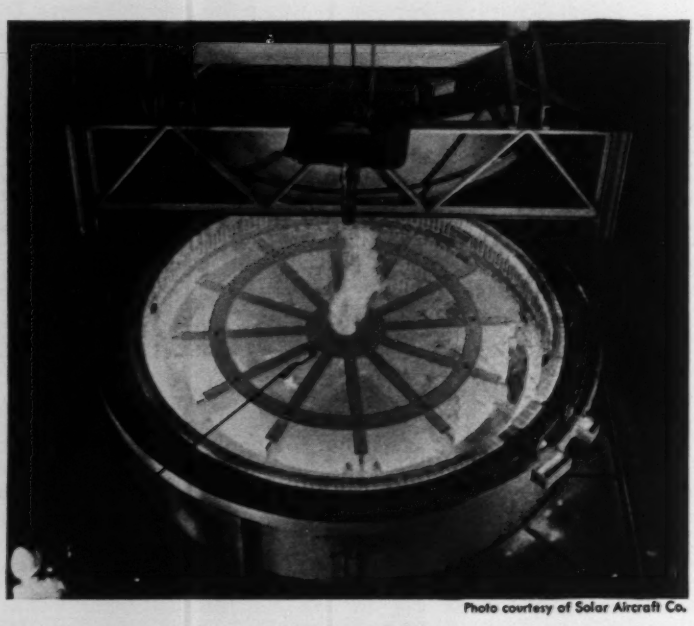


Photo courtesy of Solar Aircraft Co.

Based upon highly successful use of RA 330 in other applications with temperatures ranging up to 2250° F., Solar Aircraft Company selected RA 330 for this critical application.

For best performance specify RA 330 for your heat treating fixtures and furnace parts.

Rolled Alloys Heat Resisting Alloy Specialists will gladly be of service. For technical data—send for Bulletin No. 107.

ROLLED ALLOYS, INC.
Heat and Corrosion Resistant Alloy Specialists
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microinch finishes of 2 to 3.

Pneumatic lifts (standard equipment) speed up loading and unloading of small and medium sized parts. A sensing head, manually brought to rest on the lap plate, automatically detects whether the plate is convex, flat, or concave. Results are registered through lights on a control panel. A handwheel permits simultaneous adjustment of all conditioning rings to compensate for normal wear patterns in the lapping plate.

For further information, *write* Dept. SL-3, Crane Packing Co., 6400 Oakton St., Morton Grove, Ill.

Machines Developed for Uncoiling and Recoiling

THE UNCOILER made by Woehr has four self-centering arms of welded steel that can be expanded from 18 to 24 in. (diameter). A hand crank controls expansion. The main spindle is heat treated, alloy steel. Base and legs are constructed of heavy, welded steel. Optional features include power drive and loop control arms.

The recoiler has a drum with four 90 degree sector arms with about 1 in. of space between them when the arms are collapsed to the minimum diameter of 18 in. The expanded diameter is 22 in. Spindle on the recoiler is driven by a 3 hp motor. Power is transmitted by V-belts, wormshaft, and electric clutch.

For further information, *write* F. A. Woehr Machine Corp., 17 Favor St., Rochester 8, N. Y.

Four Types of Metal to Vinyl Adhesives Offered

ADHESIVES for vinyl to metal laminations are available in four types: 1. A curing adhesive with heat resistant hardness that can be controlled by varying curing time and temperature. 2. A simple to use thermoplastic adhesive. 3. A heat resistant adhesive for deep draws which allows stress distribution. 4. A thermosetting adhesive that offers

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GEARS by FAIRFIELD
There is no finer recommendation for the quality of YOUR PRODUCT than to be able to say it is "Equipped with FAIRFIELD GEARS!" Long a leading producer of the gears needed for high grade trucks and tractors, Fairfield also brings the same standards for quality, precision, and performance to a wide variety of products: Agricultural Implements . . . Power Shovels . . . Machine Tools . . . Road Graders . . . Lift Trucks . . . Diesel Locomotives . . . and a host of others.
Fairfield's facilities are unexcelled — you get all the benefits of high production rates and big volume output in an ultra-modern plant designed for producing fine gears EFFICIENTLY . . . ECONOMICALLY. Your inquiry will receive prompt attention. FAIRFIELD MANUFACTURING CO., INC., 2313 S. Concord Rd., Lafayette, Indiana.
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MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

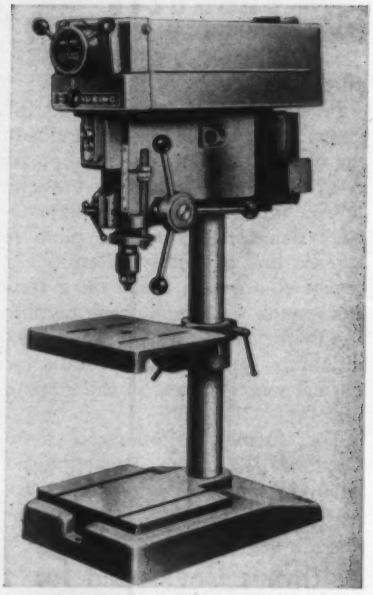
unusual heat resistance and excellent adhesion and good deep drawing properties.

All are designed to bond vinyl metal firmly enough to tear the film upon separation. In some instances bonds must be maintained during forming or drawing operations where portions of the lamination undergo elongation up to 100 per cent. Typical applications include bonding vinyl films to steel, aluminum, and magnesium.

For further information, *write* National Starch & Chemical Corp., 750 Third Ave., New York 17, N. Y.

Choice of Drives Offered On Bench and Floor Drills

ACCURACY, capacity, and efficiency are stressed in the Clausing 15 in. bench and floor drills. The units are available with variable



speed drive (500 to 4500 rpm) or five speed drive with spindle speeds from 410 to 5380 rpm.

A 3 in. column provides rigidity. Table size is 10 x 14 in. Spindle travel is 4¾ in. The spindle is a No. 2 Morse taper, or a No. 33 for ½ in. chuck. A ¾ hp motor is recommended for the variable speed drills; ½ or ¾ hp for the five speed drills.

For further information, *write* Clausing Div., Atlas Press Co., 2359 N. Pitcher St., Kalamazoo, Mich.

Hydraulic Scaffold Raises 20 Ton Loads to 19½ ft

MACHINERY and materials up to 20 tons can be lifted by a self-contained hydraulic scaffold unit.

The platform area of 11½ x 15 ft can be enlarged to 16 x 19½ ft by extending and planking the 22 outrigger arms. Hydraulically powered cylinders can be manually locked for safety. Cylinder designs can be altered to meet needs.

Wheel arrangement of the scaffold allows it to travel over rough terrain. Once in position, four jacks keep the platform level. Height from the floor to the platform in a lowered position is 66 in. Maximum hoist is 14 ft for a total elevation of 19½ ft. Gross weight is 35,000 lb.

For further information, *write* Fordees Corp., 280 Walnut St., Leetonia, Ohio.

Stamco has a new, compact and streamlined design

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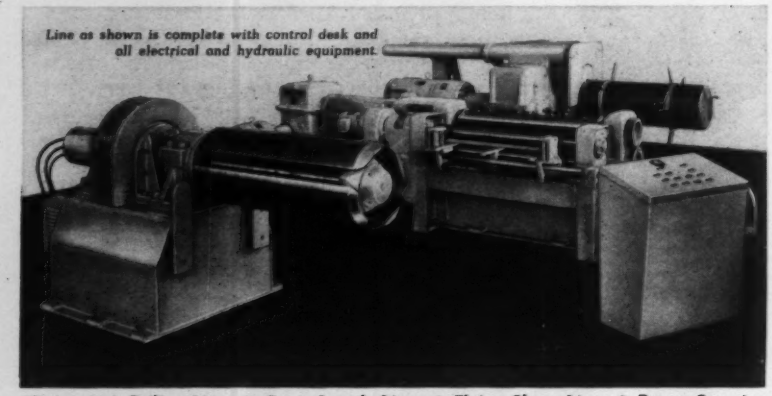

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NEW literature

Write directly to the company for a copy

Rubber Selector Chart

Publication CDS-145C contains data on applications, typical properties, primary classes, and standard industry and military specifications of silicone rubber. Silicone Products Dept., General Electric Co., Waterford, N. Y.

Brazing Alloy

Nicrobraz brazing alloy is described in Data Sheet No. 2.1.4. Engineering and brazing properties and recommended uses are listed. Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.

Solder Alloy Data

Alloy D-800, a high strength, low temperature solder alloy, is described in Bulletin Z-105. Data listed include specific gravity, specific weight, compressive strength, fatigue strength, and tensile strengths and hardness at various temperatures. Accurate Specialties Co. Inc., 345 Lodi St., Hackensack, N. J.

MF to DC Converters

Bulletin No. 112 describes the operation and provides specifications for the new FR-500 series of modular frequency to dc converters. The FR-500 is used for precise dc conversion of the outputs of turbine flow sensors, tachometers, and other frequency output transducers. Waugh Engineering Co., 7842 Burnet Ave., Van Nuys, Calif.

Ferro-Tic Manual

A four page manual describes Ferro-Tic, a machinable steel bonded carbide; typical tooling problems solved with this material; complete machining and heat treating instructions; and a listing of physical properties and stock sizes available. Sintercast Div., Chromalloy Corp., 171 Western Highway, West Nyack, N. Y.

Cryogenic Storage Vessels

A complete picture of cryogenic storage vessels and refrigerated equipment available is contained in a 15 page brochure. Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.

Delrin Acetal Resin

Delrin and its properties, design considerations, forming techniques, and examples of its application in a variety of products and industries, is discussed in a 23 page booklet, No. A-18404. Advertising Dept., E. I. du Pont de Nemours & Co., Wilmington 98, Del.

Alloy Steel Specifications

The chemical analysis requirements for government alloy steel specifications are given in chart Sec. D, No. 1. Also listed are specified forms and nearest corresponding SAE, AISI, and AMS numbers. Peter A. Frasse & Co. Inc., 17 Grand St., New York 13, N. Y.

Rectifier Wall Charts

Two convenient wall charts have been prepared to assist in the selection of optimum silicon and germanium rectifier components for basic circuits. General Electric Co., W. Genesee Street, Auburn, N. Y.

NEW BOOKS

1960 *Supplement to the Metal Cleaning Bibliographical Abstracts*, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 36 pages, $2
The supplement carries 114 references for the period 1958 through early 1960, also 100 newly added references for the period prior to 1958. References cover practical application, theory, and laboratory evaluation.

Engineering & Technical Conventions (1961 edition), Deutsch & Shea Inc., 230 W. 41st St., New York 36, N. Y., 42 pages, $4
Here's a comprehensive listing of engineering and technical meetings and conferences to be held in the U. S. during 1961, 1962, 1963, and 1964. Dates, places, and sponsors are shown for about 700 state, regional, and national meetings on technical subjects ranging from acoustics to welding.

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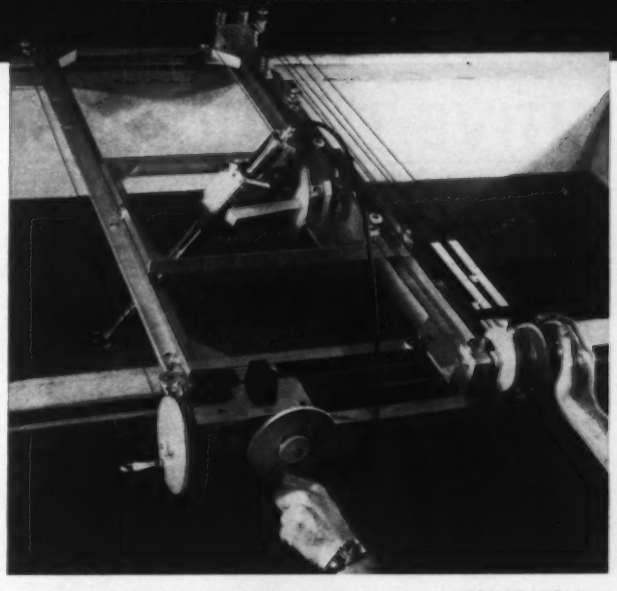

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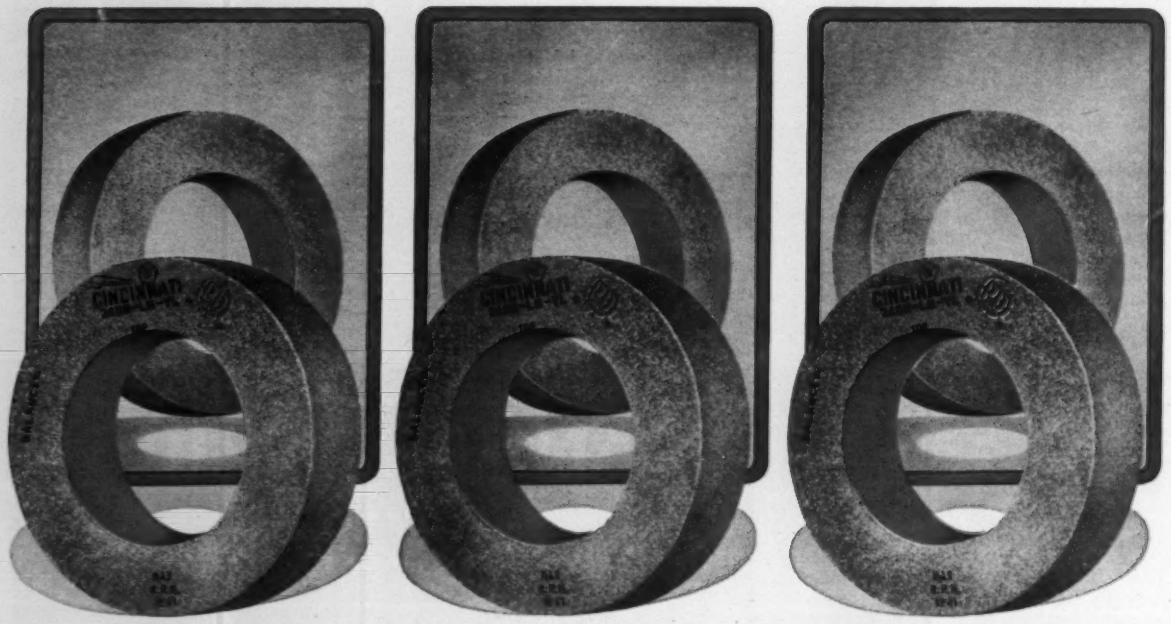

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Upturn Expected in March

LOOK FOR THE steel market to continue its sidewise movement until March.

There may be ups and downs in the meantime—small, week-to-week fluctuations in order volume—but there won't be any sustained push to a higher plateau until seasonal factors assert themselves.

The question steelmakers are asking themselves is whether they can avoid sliding backward before moving upward. Sales executives who ten days ago were talking hopefully about small gains in February have changed their tune. Now they're wondering whether they'll ship as much metal this month as they did in January.

OUTLOOK CLOUDED—They're uncertain because: 1. Some products that seemed to be on the upswing in early January have suffered reversals. 2. Buyers are ignoring traditional lead-times, waiting until the last minute to order. 3. Moderate gains in nonautomotive markets are being continually offset by requests from car-builders that part of their February tonnage be held until March.

FAST START FOR SOME—In Chicago, steelmakers are saying it's too early to tell how February will shape up, but there's encouraging news from one big mill. The orders it booked during the first three weeks of January were the highest it has received in the like period of any month since February, 1960. Sales were diversified as to product and customer, indicating that inventories are low and that some buyers are starting to order a little farther ahead.

SLOWDOWN FOR OTHERS—Elsewhere, the picture isn't so bright. In Pittsburgh and the East, mills making plates and structurals have suffered minor setbacks. After starting the year on a stronger note, the heavy products lost most of their zip. The buying pickup noted in the first two weeks of January may have reflected nothing more than pent up demand from customers who had refrained from buying in December because of yearend tax considerations. After Jan. 15, order entry fell back to the October-November pace. In plates, only the alloy and specialty items continued to show strength.

LIQUIDATION ENDING—Considering the weakness of the automotive market and the general uncertainty about February, the most encouraging thing that most observers can point to is the continued depletion of inventories. It's obvious from the large proportion of inquiries and orders specifying spot delivery that many users have reduced their stocks to a minimum. STEEL's quarterly survey of metal inventories (see Page 99) confirms that: For the first time since February, 1960, there's an increase in the number of purchasing agents planning to add to their stockpiles. Two-thirds of the buyers will stand pat during the next three months. The number planning to continue cutbacks has fallen to the lowest level in a year.

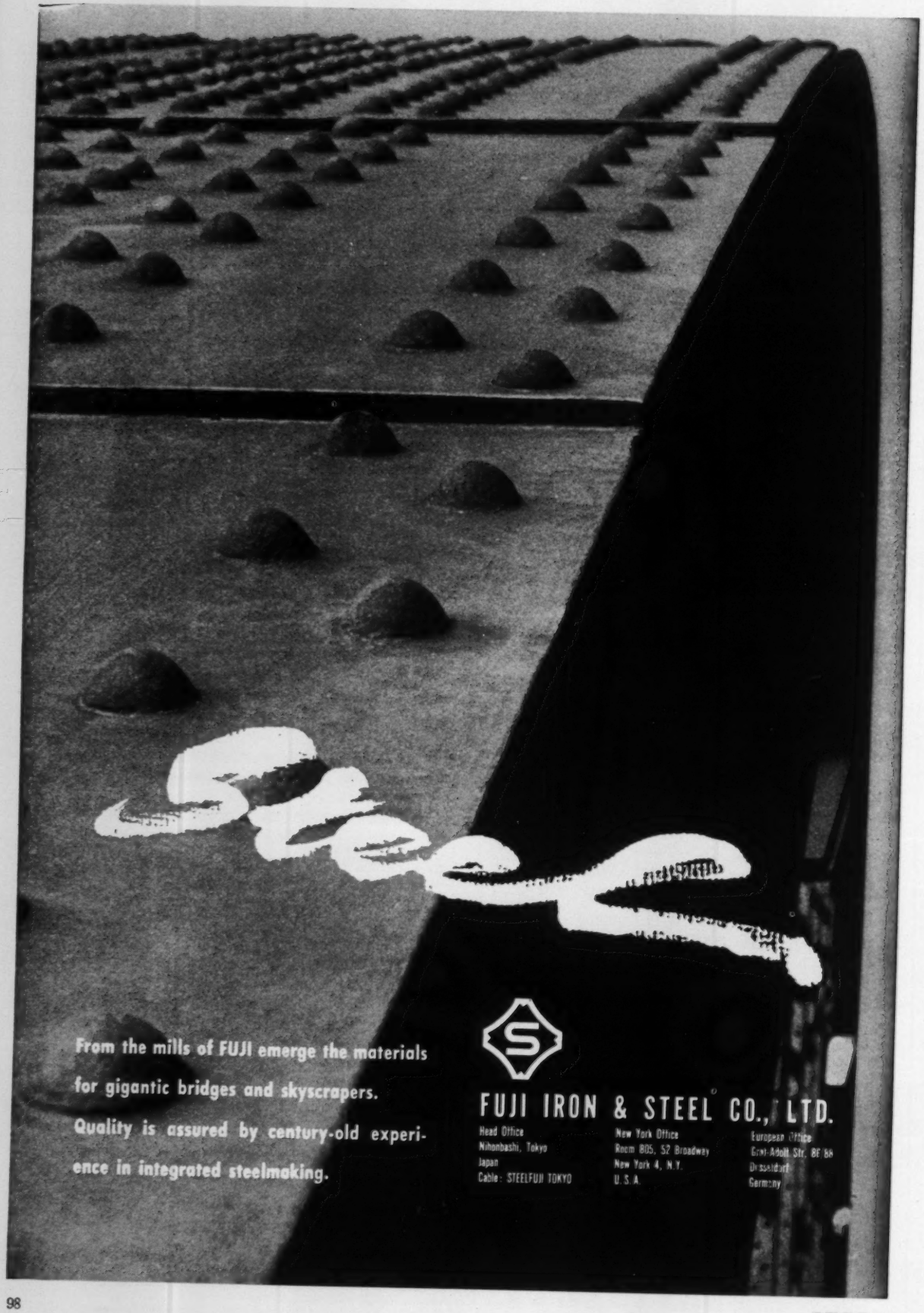
UPTURN IN MARCH—Next month, because inventory liquidation will have run its course and consumption will be trending upward, you can expect higher operations in steel. Better weather will stimulate building, work on farms, and railroad track maintenance. And any expansion in construction (including housing) will accelerate demand for steel in a variety of end products, such as pipe, hardware, earth moving machinery, and household appliances.

PRODUCTION STEADY—Ingot production in the week ended Feb. 11 will probably be close to the 1,448,000 tons that STEEL estimates the industry produced in the week ended Feb. 4. (Output then was 1.2 per cent below the 1,466,000 tons poured in the week ended Jan. 28.)

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	101	107
Reinforcing	...	108
Boiler Tubes	...	110
Canada	...	113
Charts:		
Finished Steel	...	105
Ingot Rate	104	...
Scrap Prices	...	117
Clad Steel	...	111
Coal Chemicals	...	113
Coke	...	113
Comparisons	...	105
Containers	117	...
Contracts Placed	117	...
Contracts Pend.	123	...
Electrodes	...	113
Fasteners	...	110
Ferroalloys	103	114
Fluorspar	...	113
Footnotes	...	110
Imported Steel Ingot Production	102	113
Metal Powder	104	...
	...	113

	News	Prices
Nonferrous Met. Ores	120	122
Pig Iron	...	113
Piling	117	112
Plates	...	107
Plating Material	101	107
Prestressed Strand	...	123
Price Indexes	...	110
Producers' Key	...	105
R.R. Materials	108	...
Refractories	...	110
Scrap	...	113
Semifinished	116	118
Service Centers	...	107
Sheets	102	112
Silicon Steel	100	108
Stainless Steel	...	109
Strip	104	111
Structurals	100	109
Tin Mill Prod.	117	107
Tool Steel	...	109
Tubular Goods	...	111
Wire	103	111
	103	109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STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					2nd Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT-ROLLED CARBON BARS	7%	34%	35%	19%	5%	9%	70%	21%
COLD-FINISHED BARS	5%	33%	35%	19%	8%	17%	70%	13%
H & C-R SHEETS, STRIP	6%	21%	46%	18%	9%	16%	70%	14%
LIGHT PLATES	9%	18%	45%	14%	14%	21%	64%	15%
HEAVY PLATES	10%	19%	43%	14%	14%	16%	68%	16%
STRUCTURAL SHAPES	10%	18%	50%	12%	10%	30%	55%	15%
COPPER & BRASS	23%	30%	35%	12%	—	14%	72%	14%
ALUMINUM	16%	18%	43%	18%	5%	18%	73%	9%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Metal Stock Slide Slows; Upturn Sighted

Answers of buyers to STEEL's quarterly inventory survey indicate turning of corner may not be far off, despite absence of strong signs of a resurgence

THE INVENTORY reduction trend has reached the reversal point. Respondents to STEEL's quarterly survey of metals buyers attest to the switch: For the first time since February, 1960, there was an increase in the number of purchasing agents reporting inventory building plans. And the number expecting further reductions fell to the lowest level in a year.

Many buyers now have their reserves at desired levels. In the last survey (STEEL, Nov. 7, 1960, p. 139), 32 per cent of the respondents said they'd chop ferrous reserves in the ensuing three months. Only 6 per cent said they'd build. And that's exactly what happened.

• **Upturn Sighted** — Although 17 per cent of the purchasing agents plan further reductions in the next three months, 16 per cent expect higher inventories. The greatest number of respondents (67 per cent) since August, 1958, see levels remaining stable. So while no strong resurgence is indicated, that elusive corner to turn at last may be in sight.

Backing such a belief is the National Association of Purchasing Agents. Its last survey of members reveals 36 per cent see business improving in the first six months of 1961 over the last half of 1960. Only 15 per cent predict poorer conditions. Members of the Purchasing Agents Association of Chicago agree that the reversal point in inventory reductions is approaching.

Another factor pointing to recovery: STEEL's poll of component buyers (STEEL, Jan. 2, p. 239) revealed parts purchasers will stand pat in the first quarter. This leveling out might foreshadow an upswing.

• **How They Stand** — Metal reserves increased in all product groups in the 10 to 30 day category. Stocks, except for cold finished bars (up 2 percentage points) dropped in the 60 to 90 day group. About 42 per cent of all metal stocks remain in the 30 to 60 day period which showed a mixed trend.

Delivery problems remain negligible as the mediocre pace of busi-

ness permits quick deliveries from mills.

Overstocks, still plaguing 16 per cent of STEEL's respondents, are, nevertheless, at the lowest point since strikebound 1959 and early 1960 which felt the aftereffects of the shutdown. In the ferrous line, heavy and light plates, structurals (due to low construction expenditures), and hot rolled carbon bars were voted in greatest surplus.

• **Nonferrous** — Aluminum mill products received the most overstock mentions of any metal goods, largely because of the industry's excess production and slow market. As a result, 18 per cent of the aluminum buyers will slice inventories in the second quarter; 9 per cent plan increases.

Although the same problem is faced in copper as in aluminum, as many respondents (14 per cent) plot increases as anticipate reductions. The hedging can be attributed to the low price of copper and output trimming by producers designed to firm the price.

A very pertinent and timely message addressed to Purchasing Agents and Superintendents of Steel Mills, Foundries and Metalworking Plants:

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Allegheny Activates New Vacuum-Melting Furnace

A large vacuum melting furnace has been placed in operation at the Watervliet (N. Y.) Works of Allegheny Ludlum Steel Corp. The new furnace will produce ingots up to 50 in. in diameter, weighing about 30 tons. Expanded use of vacuum melted steel in civilian goods markets is foreseen by the company.

In the startup phase, the furnace has produced ingots of superalloys and other high alloy steels of 40 in. diameters.

Allegheny Ludlum now has 11 consumable electrode, vacuum melting furnaces in commercial production.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 108 & 109

While diversified manufacturing demand for sheets appears a little more active than it was, producers don't look for much pickup in ordering this month. February volume, it's thought, will be about on a par with January's, which was only slightly better than that of the preceding month. One Chicago area mill says its orders in the first three weeks of January were the highest for the first three weeks of any month since February, 1960.

Orders received by that mill during the period were well diversified, both as to product and type of buyer. Also, the orders involved tonnages for January, February, and March delivery, indicating some consumers are beginning to order a little farther ahead. However, automotive needs have been pushed back, and the slack is not being taken up by other consumers. The appliance manufacturing industry is continuing to take steel, but it also curtailed production schedules recently.

About the most encouraging development in the market seems to be agreement that most consumers have just about exhausted their inventories. This is indicated by the increase in inquiries and orders specifying spot deliveries. However, competition for orders is so keen users can get any kind of delivery they want. Recently, for example, one mill lost an order for cold rolled on which it had promised delivery in two and a half weeks.

A competitor with in process tonnage got the order, apparently because of quicker shipment.

Generally, deliveries range two to three weeks on hot rolled, two to five weeks on cold rolled, three weeks on galvanized. There has been some stiffening of deliveries in certain specialties, notably sheets for heavy transformers—some producers are booked solidly on high silicon through the first half of March.

Steel Bars . . .

Bar Prices, Page 107

Orders for hot rolled carbon steel bars continue to be disappointing. Volume is diversified, and sellers are hoping miscellaneous industrial demand will broaden and take up some of the slack resulting from cutbacks in automotive requirements.

Demand for cold drawn bars continues to lag, with deliveries easy. Converters are well stocked with hot bars, and in some cases, they have cold drawn stock in inventory for immediate shipment. Alloy bars, both hot and cold drawn, are also available for prompt shipment.

Demand on armament account is reported in the East. However, general industrial requirements are slow, including that from forging shops and fastener manufacturers. Watertown (Mass.) Arsenal continues to be a leading buyer of titanium alloy bar stock. Keystone Drawn Steel Co., Spring City, Pa., booked 128 tons of cold finished carbon bars for the Raritan (N. J.) Arsenal.

McKay Machine Co., Youngstown, is building a 50,000-lb triple, cold draw bench for bars. The customer: Indian Bright Steel Co. Ltd., Bombay. The unit, which will cost about $200,000, will handle bars up to 3 in. in diameter. It will be shipped late this month.

Plates . . .

Plate Prices, Page 107

Except for a mild bulge in buying on Navy account, plate demand is slow. That's particularly true of sheared carbon and universal plates. Most makers, however, look for some improvement before the end of this quarter, though many plate fabricating shops are estimating a subnormal volume of work and are adding little to backlogs.

Mill deliveries of sheared and universal plates range ten days to two weeks, alloy plates four to five weeks.

Generally, it's felt construction requirements will broaden this spring. Also, more tank and shipwork is anticipated. But tank shops are reported well supplied with light gage plates. Also, bridge construction has been marked by the absence of plate girder design structures for several months.

The plate mills are not getting much business from makers of line pipe; pipe that's now going into the ground was ordered last year. It's likely there'll be some delay before gas transmission projects approved by the Federal Power Commission in the last half of 1960 will have an impact on demand.

As is the case with the structural fabricators, competition among the plate fabricators for new projects is resulting in pressure on fabricated prices.

Brisk inquiry for alloy plates and specialties is reported.

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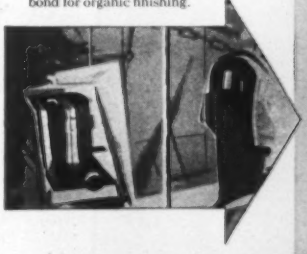

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A general contract for construction of a tank farm involving 1000 tons of plates has been placed with the Carroll Co., Portland, Oreg., low bidder at $633,500 to the Port of Vancouver, Wash.

Steel Exports Gain but Still Topped by Imports

Imports of steel mill products in the first 11 months of 1960 totaled 3,164,079 net tons (valued at $425,240,482), topping exports of 2,816,487 net tons (valued at $562,005,596). In the same period of 1959, imports amounted to 3,855,228 tons (valued at $444,335,307), compared with exports of 1,545,284 tons (valued at $334,772,018).

The tonnages cited are exclusive of figures for fabricated and finished steel goods, iron products, and ferroalloys.

In the first 11 months last year, imports of other steel products totaled 3,371,240 tons (valued at $474,386,910). That compares with exports of 3,046,063 tons (valued at $678,707,087). In the same period of 1959, imports were 4,064,650 tons (valued at $493,429,741) compared with exports of 1,829,660 tons (valued at $458,155,784).

During the first 11 months of 1960, imports of iron products and ferroalloys amounted to 481,242 tons (valued at $58,619,067) compared with exports of 206,860 tons (valued at $28,777,638). In the like period of 1959, imports were 795,528 tons (valued at $79,339,651) and exports were 128,841 tons (valued at $23,175,293).

Total imports of iron and steel products (all classifications) in the first 11 months amounted to 3,852,482 tons (valued at $533,005,977). That compares with exports of 3,252,923 tons (valued at $707,484,725). In the like period of 1959, imports were 4,860,178 tons (valued at $572,769,392), and exports were 1,958,501 tons (valued at $481,331,077).

Iron and steel scrap exports in the first 11 months last year amounted to 6,691,769 tons (valued at $221,005,919). Imports in the period were only 166,396 tons (valued at $5,785,314). In the same period of 1959, exports amounted to 4,298,641 tons (valued at $144,372,368) against imports of 294,976 tons (valued at $10,806,652).

Foreign Steel Use Ban in Roadwork Making Headway

The movement to ban use of imported steel in road building, started in the South some months ago, seems to be gaining ground.

Last week, the Alabama State Highway Department announced it has entered an order (agreeable to the U. S. Bureau of Roads) that henceforth only domestic steel and cement will be specified in contracts awarded by the state for road and bridge construction.

At Houston, steel importers, who were refused an injunction by a district court in a test case against a Texas Highway Commission ban on use of foreign steel in road construction, said they would appeal. The suit was filed by the Texas Association of Steel Importers Inc., the European Steel Products Corp., Richard J. Mason, and Jordan J. Parsley. (Mr. Mason is head of the importing group and a vice president of European Steel Products Corp. Mr. Parsley is vice president of the International Steel Depot, a Houston warehousing firm.) The highway commission ban was issued Oct. 28, 1960, and made effective Jan. 1 of this year.

Distributors . . .

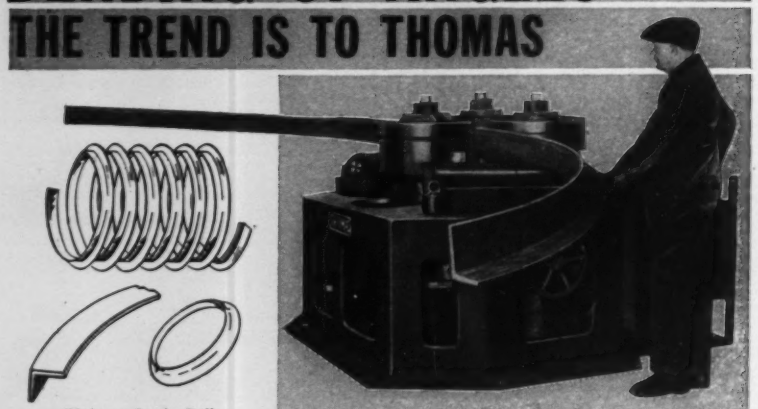
Prices, Page 112

Steel service centers report slightly improved sales, and they are looking for a continued upswing. March is normally one of their better months. Distributor stocks are ample, and they are well balanced. However, they have increased their mill purchases in step with the increased order volume coming to them.

The adverse effects of foreign steel offerings are still apparent. One Seattle firm, for example, reports it has a supply of Japanese plates and galvanized sheets which it imported 18 months ago.

Some distributors claim "mills are beating the bushes," offering prompt deliveries and other inducements for orders of warehouse size.

FOR SEGMENT OR CIRCLE BENDING OF ANGLES
THE TREND IS TO THOMAS



Thomas Angle Rolls will handle angles up to 6 x 6 x 7/8"

Thomas Angle Benders are of all steel construction and come in two styles and four sizes. Standard rolls permit "leg in" and "leg out" bending of angles. The machines may be converted for bending flats, rounds, squares, beams, channels, pipe and other shapes.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Write for Bulletin 314-A
65

Ferroalloys . . .

Ferroalloy Prices, Page 114

Union Carbide Metals Co., a division of Union Carbide Corp., New York, is offering a new, refined chrome at a price 5 cents a pound under the product it replaces. The company has also revised specifications and reduced the price of charge chrome 2.5 cents a pound, and is reducing by 2 cents a pound the prices on Simplex, low carbon ferrochrome and two grades of ferrochrome-silicon.

Specifications and prices on other grades of high carbon ferrochrome, low carbon ferrochrome, and ferrochrome-silicon were not changed.

New refining techniques are said to make possible production economies and significant improvement in refined chrome quality. Tighter chromium and carbon specifications, a lower silicon content, and a denser product are offered. Refined chrome is used as a low-cost chromium addition to stainless, aircraft, bearing, and tool steels, steel castings, and cast iron.

The new charge chrome replaces two grades of that product previously offered by Union Carbide. It's used for low-cost furnace additions of chromium in the production of stainless steels.

New specifications and prices for carload lump bulk quantities of refined chrome, charge chrome, ferrochrome-silicon, and Simplex, low carbon ferrochrome follow:

Refined Chrome—Chromium 58-65%; carbon 4.25% max; silicon 1.00% max; sulfur 0.03% max. Price: 21 cents per pound of chromium.
Charge Chrome—Chromium 58-65%; carbon 6-7% max; silicon 4-6% max; sulfur 0.03% max. Price: 20 cents per pound of chromium.
40/43 Ferrochrome-Silicon—Chromium 39-41%; silicon 42-45%; carbon 0.05% max. Price: 22.50 cents per pound of chromium and 14.60 cents per pound of silicon.
34/46 Ferrochrome-Silicon—Chromium 33-36%; silicon 45-48%; carbon 0.05% max. Price: 22.50 cents per pound of chromium and 14.60 cents per pound of silicon.
Simplex Ferrochrome 1—Chromium 63-66%; silicon 5-7%; carbon 0.025% max. Price: 31.50 cents per pound of chromium.
Simplex Ferrochrome 2—Chromium 68-71%; silicon 2.00% max; carbon 0.025% max. Price: 31.50 cents per pound of chromium.

Wire . . .

Wire Prices, Pages 109 & 110

Demand for manufacturers' wire is reported a shade more active than it was, but deliveries continue to be prompt. That is also the case with high carbon and alloy wire specialties. Welded wire fabric is moving slowly seasonally.

Most consumers of wire and wire products are operating on low inventories, but they are holding back new orders until their backlogs of finished goods become larger. Makers of springs, screws, and other fasteners are in this category. The result: Difficult scheduling of production at wire mills.

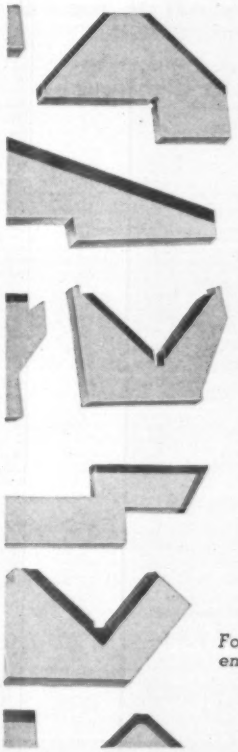
American Steel & Wire Div., U. S. Steel Corp., Cleveland, has booked an order for galvanized steel barbed wire from the U. S. Engineer, Chicago, totaling $224,400.

Tubular Goods . . .

Tubular Goods Prices, Page 111

Producers of mechanical tubing have been hard hit by cutbacks in auto production. Firms that are heavily dependent on sales to the carbuilders and their suppliers say business is deteriorating rapidly. One maker that operated at 55 per cent of capacity in January predicts a drop to 35 per cent this month unless there's a sudden upturn in automotive requirements.

THE OHIO KNIFE CO. CAN MAKE

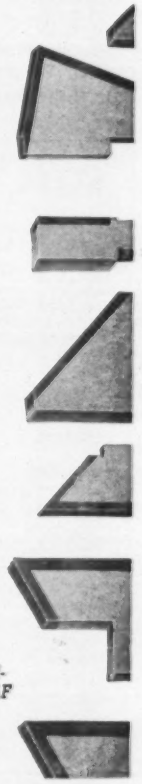


BETTER — our time proven process of bonding special analysis tool steel to tough machineable steel, then hardening the tool steel (65-66 Rockwell C) along entire length, enables us to give you hardened surfaces anywhere you want them.

FASTER — we make hundreds of these special shapes for every conceivable application—our new production methods are geared to meet fast delivery requirements.

LOWER-IN-PRICE — no one is as completely set-up — design, engineering, heat treating and production—to deliver these special ways to you at a price far below what it would cost you to make them yourself.

IMPORTANT — we carry in hardened stock 12 standard way shapes in 88 sizes, with delivery from stock to 5 weeks.



For FREE Bulletin-A, describing O-KNI-CO hardened ways, wear plates, etc., write Dept. 122-AF

THE OHIO KNIFE CO.
CINCINNATI 23, OHIO

Demand for line pipe continues to be disappointing. Welded pipemakers are running slack, and they are buying little plate tonnage.

The latest survey by Hughes Tool Co. shows 1544 rotary oil drilling rigs in operation in this country, down 15 from the preceding week and the lowest number in 13 years. There were 162 rigs operating in Canada during the week, an increase of two from the week before.

Inquiries for cast iron pipe are beginning to develop as municipalities prepare for spring operations. Fair tonnages for Seattle, Bellingham, and Vancouver, Wash., are pending.

Dow Chemical Posts New Price for Polystyrene

Dow Chemical Co., Midland, Mich., says it has reduced its price on general purpose crystal granules of polystyrene to 18 cents a pound to stay competitive. Over the last few months, the base prices for the most commonly used grades have declined from 21.5 to 18 cents a pound.

Stainless Steel . . .

Stainless Steel Prices, Page 111

Production of stainless steel in 1960 is estimated at 1,003,637 net tons, down slightly from the 1.1 million tons turned out in 1959. The American Iron & Steel Institute reports 1960 was the sixth year in which stainless output exceeded the 1 million ton mark.

Preliminary figures also show that alloy steel production (other than stainless) in 1960 amounted to 7,392,171 net tons.

Steel Ingot Production Turns Slightly Downward

Steel product demand has failed to rise to expected levels. Ingot producers have curtailed operations, and additional cutbacks are indicated before production levels off.

District market reports to STEEL indicate operations are likely to sag slightly farther in the week ended Feb. 11. If that happens, it will mark the third straight weekly decline, following a 2.2 per cent drop reported in the week ended Jan. 28 and a decline of 1.2 per cent estimated by STEEL for the week ended Feb. 4.

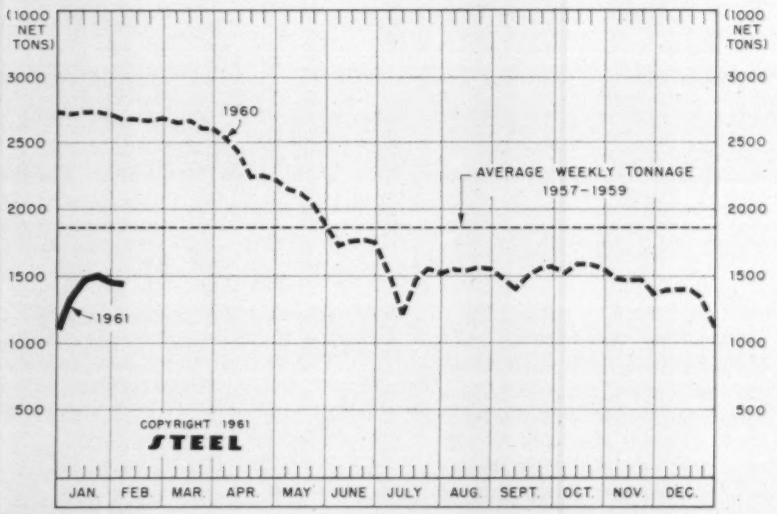
- **Pittsburgh**—Steelmaking was expected to hold steady last week (ended Feb. 4) and to drop about 6000 tons in the week ending Feb. 11.
- **Chicago**—Little is happening to stimulate optimism in steelmaking circles here. It is still pretty much a "touch and go" situation. Production was steady last week (ended Feb 4) at about 54 per cent of capacity on the 1960 basis.
- **Detroit**—Ingot output was down last week, reflecting the slowdown in automotive sales and reduced buying schedules by the automotive and appliance industries. STEEL estimates production was off 10 or more index points.
- **Youngstown** — Steel operations here are up to 44 per cent of capacity (based on the 1960 basis). The rate reflects slightly better business (including demand for pipe), but, mainly, it is the result of activities by one mill. It is accumulating reserve stocks in preparation for a shutdown of three to four weeks (beginning about Feb. 17) for a changeover of some facilities.
- **Buffalo**—Steel ingot output was expected to drop in the week ending Feb. 4. But optimism has been bolstered by the report that a major firm plans to relight another blast furnace. The mill probably wouldn't increase its hot metal output unless it felt assured of continued improvement in steelmaking operations.
- **Cleveland**—Production is expected to turn slightly upward following a drop of 4 index points during the week ended Jan. 28.
- **Birmingham**—With one steel producer cutting operations from five days a week to four days, ingot output was expected to drop around 1650 tons in the week ended Feb. 4.
- **San Francisco**—Ingot production is holding steady here. No market development indicates a sudden upturn.

STEEL INGOT PRODUCTION

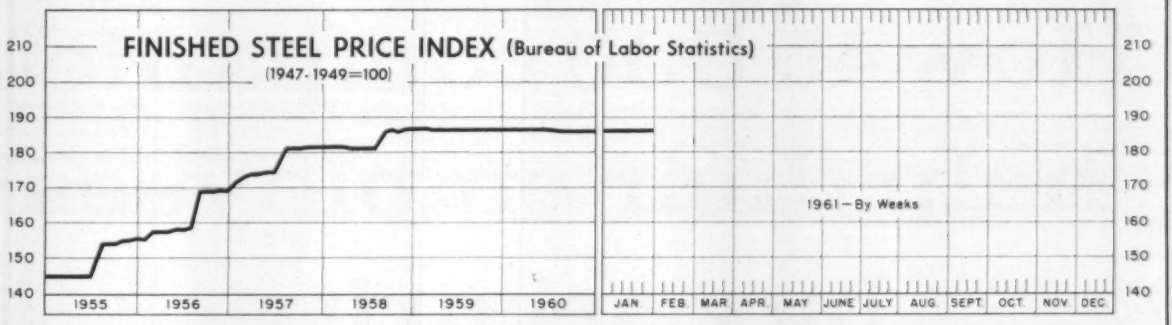
Weeks Ended	Net Tons	Change
Feb. 4	1,448,000*	— 1.2%
Jan. 28	1,466,000	— 2.2%
Jan. 21	1,499,000	+ 1.1%
Totals to Jan. 28		
1961	5,808,000	—46.6%
1960	10,886,000	

DISTRICTS	Week Ended Jan. 28 Tons‡	Week Ended Jan. 28 Index†	Week Ended Jan. 21 Index†
Northeastern	205,741	77	82
Buffalo	71,069	73	73
Pittsburgh	278,449	69	70
Youngstown	129,186	76	76
Cleveland	67,594	73	77
Detroit	103,868	99	102
Chicago	314,224	84	87
Cincinnati	66,356	88	87
St. Louis	42,040	80	85
Southern	86,717	80	80
Western	98,207	84	84
Industry	1,466,000	78.7	80.5

*Estimated by STEEL. †1957-59=100. ‡District tonnages are approximate and will not necessarily add to national total.



Price Indexes and Composites



Jan. 31, 1961	Week Ago	Month Ago	Jan. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 31

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Feb. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

	Feb. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$127.91
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	32.67	32.00	31.00	42.00	50.50

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.97	5.975	4.90
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb)box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	5.025-5.375

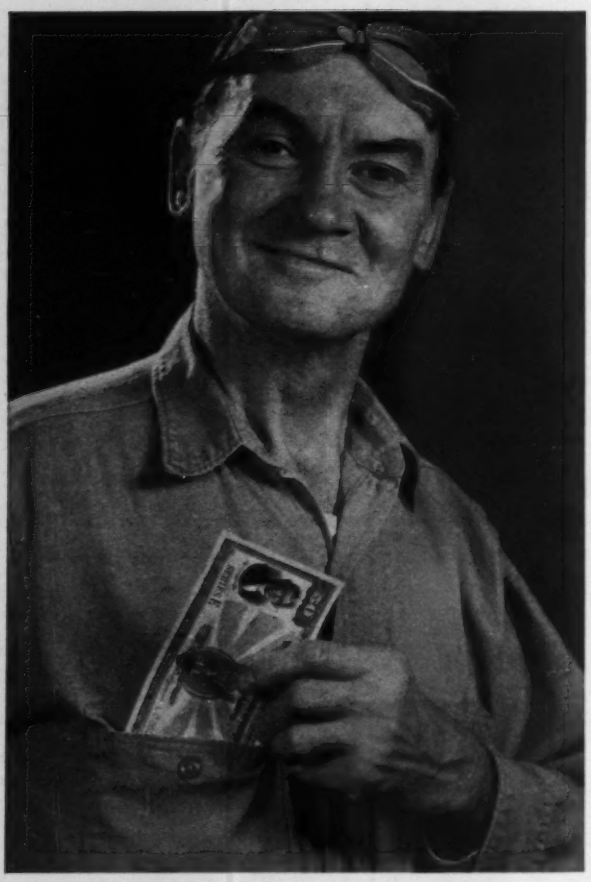
PIG IRON, Gross Ton	Feb. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	62.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$31.50	$29.50	$29.50	$42.50	$49.50
No. 1 Heavy Melt, E. Pa.	36.00	36.00	35.00	42.00	53.00
No. 1 Heavy Melt, Chicago	30.50	30.50	28.50	41.50	49.00
No. 1 Heavy Melt, Valley	32.50	32.50	30.50	47.50	54.50
No. 1 Heavy Melt, Cleve.	28.50	28.50	26.50	43.50	52.00
No. 1 Heavy Melt, Buffalo	27.50	27.50	23.50	36.50	47.50
Rails, Rerolling, Chicago	54.50	54.50	53.50	63.50	69.00
No. 1 Cast, Chicago	41.50	39.50	38.50	55.50	48.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

How 45,000 companies help their employees buy security



45,000 American business firms have put in a valuable service for their employees—the Payroll Savings Plan for U.S. Savings Bonds. Through this plan the company payroll clerk sets aside a certain amount for each participating employee, each payday. Bonds are delivered to employees as soon as they are fully paid for. It's fully automatic, and the easiest way in the world to save.

More than 8 million employees are using the plan, and are saving about $2 billion in Savings Bonds a year. These funds have helped buy homes, finance vacations, assure college educations and provide nest-eggs for retirement.

If your company has not installed the Payroll Savings Plan thus far, contact your State Savings Bonds Director and have him show you how the Plan works. Get his experienced help in presenting the Plan to your organization. Or write Savings Bonds Division, U.S. Treasury Department, Washington, 25 D. C.

Hats off to American Industry!

"American Industry—by promoting the Payroll Savings Plan—has given the Savings Bonds Program its greatest success," says William H. Neal, National Director of the Treasury's Savings Bonds Program.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

20th ANNIVERSARY 1941 1961

STEEL The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Steel Prices

Mill prices as reported to STEEL, Feb. 1, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 108; footnotes, page 110.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall, Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy, Pa. B14 ..... 82.00
Farrell, Pa. S3 ..... 82.00
Lowellville, O. S3 ..... 82.00
Midland, Pa. C18 ..... 82.00
Munhall, Pa. U5 ..... 82.00
Sharon, Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville, Ill. K4 ... $82.00
Bessemer, Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton, Pa. U5 ..... 80.00
Ensley, Ala. T2 ..... 80.00
Fairfield, Ala. T2 ..... 80.00
Fontana, Calif. K1 ..... 90.50
Gary, Ind. U5 ..... 80.00
Johnstown, Pa. B2 ..... 80.00
Lackawanna, N.Y. B2 .. 80.00
Munhall, Pa. U5 ..... 80.00
Owensboro, Ky. G8 ..... 80.00
S. Chicago, Ill. R2, U5 .. 80.00
S. Duquesne, Pa. U5 .... 80.00
Sterling, Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton, O. R2 ..... 102.00
Clairton, Pa. U5 ..... 99.50
Conshohocken, Pa. A3 . 104.50
Ensley, Ala. T2 ..... 99.50
Fairfield, Ala. T2 ..... 99.50
Farrell, Pa. S3 ..... 99.50
Fontana, Calif. K1 .... 109.00
Gary, Ind. U5 ..... 99.50
Geneva, Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown, Pa. B2 ..... 99.50
Lackawanna, N.Y. B2 .. 99.50
LosAngeles B3 ..... 109.00
Midland, Pa. C18 ..... 99.50
Munhall, Pa. U5 ..... 99.50
Owensboro, Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon, Pa. S3 ..... 99.50
S. Chicago R2, U5, W14 . 99.50
S. Duquesne, Pa. U5 ... 99.50
S. SanFrancisco B3 ... 109.00
Warren, O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem, Pa. B2 ... $119.00
Bridgeport, Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton, O. R2, T7 .... 119.00
Conshohocken, Pa. A3 . 126.00
Detroit S41 ..... 119.00
Economy, Pa. B14 .... 119.00
Farrell, Pa. S3 ..... 119.00
Fontana, Calif. K1 .... 140.00
Gary, Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind. Harbor, Ind. Y1 .... 119.00
Johnstown, Pa. B2 .... 119.00
Lackawanna, N.Y. B2.. 119.00
LosAngeles B3 ..... 139.00
Lowellville, O. S3 .... 119.00
Massillon, O. R2 ..... 119.00
Midland, Pa. C18 ..... 119.00
Munhall, Pa. U5 ..... 119.00
Owensboro, Ky. G8 .... 119.00
Seattle(6) B3 ..... 140.00
Sharon, Pa. S3 ..... 119.00
S. Chicago R2, U5, W14 . 119.00
S. Duquesne, Pa. U5 .... 119.00
Struthers, O. Y1 ..... 119.00
Warren, O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton, O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary, Ind. U5 ..... 122.50
S. Chicago, Ill. R2, W14 . 122.50
S. Duquesne, Pa. U5 .... 122.50
Warren, O. C17 ..... 122.50

SKELP
Aliquippa, Pa. J5 ..... 5.05
Benwood, W. Va. W10 ... 5.05
Ind. Harbor, Ind. Y1 .... 5.05
Munhall, Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren, O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity, Ala. R2 .. 6.40
Aliquippa, Pa. J5 ..... 6.40
Alton, Ill. L1 ..... 6.60
Bartonville, Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora, Pa. A7 ..... 6.40
Fairfield, Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor, Ind. Y1 . 6.40
Johnstown, Pa. B2 ..... 6.40
Joliet, Ill. A7 ..... 6.40
KansasCity, Mo. S5 .... 6.65
Kokomo, Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa, Colo. C10 .... 6.65
Monessen, Pa. P7 ..... 6.40
Pittsburg, Calif. C11 .... 7.20
Portsmouth, O. P12 ..... 6.40
Roebling, N.J. R5 ..... 6.50
S. Chicago, Ill. R2, W14 . 6.40
SparrowsPoint, Md. B2 .. 6.50
Sterling, Ill. (1) N15 .... 6.40
Sterling, Ill. N15 ..... 6.50
Struthers, O. Y1 ..... 6.40
Worcester, Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity, Ala. R2 ... 5.50
Aliquippa, Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer, Ala. T2 ..... 5.50
Bethlehem, Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton, Pa. U5 ..... 5.50
Fairfield, Ala. T2 ..... 5.50
Fontana, Calif. K1 ..... 6.30
Gary, Ind. U5 ..... 5.50
Geneva, Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind. Harbor, Ind. I-2, Y1 . 5.50
Johnstown, Pa. B2 ..... 5.55
Joliet, Ill. P22 ..... 5.50
KansasCity, Mo. S5 .... 5.60
Lackawanna, N.Y. B2 .. 5.55
LosAngeles B3 ..... 6.20
Minnequa, Colo. C10 .... 5.80
Munhall, Pa. U5 ..... 5.50
Niles, Calif. P1 ..... 6.25
Phoenixville, Pa. P4 .... 5.55
Portland, Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S. Chicago, Ill. U5, W14 . 5.50
S. SanFrancisco B3 .... 6.15
Sterling, Ill. N15 ..... 5.50
Torrance, Calif. C11 .... 6.20
Weirton, W. Va. W6 .... 5.50

Wide Flange
Bethlehem, Pa. B2 ..... 5.55
Clairton, Pa. U5 ..... 5.50
Fontana, Calif. K1 ..... 6.45
IndianaHarbor, Ind. I-2.. 5.50
Lackawanna, N.Y. B2 .. 5.55
Munhall, Pa. U5 ..... 5.50
Phoenixville, Pa. P4 .... 5.55
S. Chicago, Ill. U5 ..... 5.50
Sterling, Ill. N15 ..... 5.50
Weirton, W. Va. W6 .... 5.50

Alloy Std. Shapes
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall, Pa. U5 ..... 6.80
S. Chicago, Ill. U5, W14.. 6.80

H.S., L.A., Std. Shapes
Aliquippa, Pa. J5 ..... 8.05
Bessemer, Ala. T2 ..... 8.05
Bethlehem, Pa. B2 ..... 8.10
Clairton, Pa. U5 ..... 8.05
Fairfield, Ala. T2 ..... 8.05
Fontana, Calif. K1 ..... 8.85
Gary, Ind. U5 ..... 8.05
Geneva, Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind. Harbor, Ind. I-2, Y1. 8.05
Johnstown, Pa. B2 ..... 8.10
KansasCity, Mo. S5 .... 8.15
Lackawanna, N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.75
Munhall, Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S. Chicago, Ill. U5, W14.. 8.05
S. SanFrancisco B3 .... 8.70
Sterling, Ill. N15 ..... 7.75
Struthers, O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem, Pa. B2 ..... 8.10
Ind. Harbor, Ind. I-2 .... 8.05
Lackawanna, N.Y. B2 .. 8.10
Munhall, Pa. U5 ..... 8.05
S. Chicago, Ill. U5 ..... 8.05
Sterling, Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem, Pa. B2 ..... 5.55
Ind. Harbor, Ind. I-2 .... 5.50
Lackawanna, N.Y. B2 .. 5.55
Munhall, Pa. U5 ..... 5.50
S. Chicago, Ill. I-2, U5 .. 5.50

STEEL SHEET PILING
Ind. Harbor, Ind. I-2 .... 6.50
Lackawanna, N.Y. B2 .. 6.50
Munhall, Pa. U5 ..... 6.50
S. Chicago, Ill. I-2, U5 .. 6.50
Weirton, W. Va. W6 .... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity, Ala. R2 .. 5.30
Aliquippa, Pa. J5 ..... 5.30
Ashland, Ky. (15) A10 ... 5.30
Atlanta A11 ..... 5.50
Bessemer, Ala. T2 ..... 5.30
Clairton, Pa. U5 ..... 5.30
Claymont, Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville, Pa. L7 ..... 5.30
Conshohocken, Pa. A3 .. 5.30
Ecorse, Mich. G5 ..... 5.30
Fairfield, Ala. T2 ..... 5.30
Farrell, Pa. S3 ..... 5.30
Fontana, Calif. (30) K1 .. 6.10
Gary, Ind. U5 ..... 5.30
Geneva, Utah C11 ..... 5.30
GraniteCity, Ill. G4 .... 5.40
Houston S5 ..... 5.40
Ind. Harbor, Ind. I-2, Y1 . 5.30
Johnstown, Pa. B2 ..... 5.30
Lackawanna, N.Y. B2 .. 5.30
Mansfield, O. E6 ..... 5.30
Minnequa, Colo. C10 .... 6.15
Munhall, Pa. U5 ..... 5.30
Newport, Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale, Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon, Pa. S3 ..... 5.30
S. Chicago, Ill. U5, W14.. 5.30
SparrowsPoint, Md. B2 .. 5.30
Sterling, Ill. N15 ..... 5.30
Steubenville, O. W10 .... 5.30
Warren, O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30
Youngstown (27) R2 .... 5.30

PLATES, Carbon Abras. Resist.
Claymont, Del. P4 ..... 7.05
Fontana, Calif. K1 ..... 7.85
Geneva, Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown, Pa. B2 ..... 7.05
SparrowsPoint, Md. B2 .. 7.05

PLATES, Wrought Iron
Economy, Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa, Pa. J5 ..... 7.95
Ashland, Ky. A10 ..... 7.95
Bessemer, Ala. T2 ..... 7.95
Clairton, Pa. U5 ..... 7.95
Claymont, Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville, Pa. L7 ..... 7.95
Conshohocken, Pa. A3 .. 7.95
Economy, Pa. B14 ..... 7.95
Ecorse, Mich. G5 ..... 7.95
Fairfield, Ala. T2 ..... 7.95
Farrell, Pa. S3 ..... 7.95
Fontana, Calif. (30) K1 .. 8.75
Gary, Ind. U5 ..... 7.95
Geneva, Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind. Harbor, Ind. I-2, Y1. 7.95
Johnstown, Pa. B2 ..... 7.95
Munhall, Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon, Pa. S3 ..... 7.95
S. Chicago, Ill. U5, W14.. 7.95
SparrowsPoint, Md. B2 .. 7.95
Sterling, Ill. N15 ..... 7.625
Warren, O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy
Aliquippa, Pa. J5 ..... 7.50
Claymont, Del. P4 ..... 7.50
Coatesville, Pa. L7 ..... 7.50
Economy, Pa. B14 ..... 7.50
Farrell, Pa. S3 ..... 7.50
Fontana, Calif. K1 ..... 8.30
Gary, Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind. Harbor, Ind. Y1 .... 7.50
Johnstown, Pa. B2 ..... 7.50
Lowellville, O. S3 ..... 7.50
Munhall, Pa. U5 ..... 7.50
Newport, Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon, Pa. S3 ..... 7.50
S. Chicago, Ill. U5, W14.. 7.50
SparrowsPoint, Md. B2 .. 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont, Del. P4 ..... 6.375
Conshohocken, Pa. A3 .. 6.375
Ind. Harbor, Ind. I-2 .... 6.375
Munhall, Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S. Chicago, Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ... 5.55
Ashland l.c.l. (15) A10 .. 6.05
Cleveland c.l. R2 ..... 6.05
Warren, O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala. City, Ala. (9) R2 ... 5.675
Aliquippa, Pa. (9) J5 ... 5.675
Alton, Ill. L1 ..... 5.875
Atlanta (9) A11 ..... 5.875
Bessemer, Ala. (9) T2 .. 5.675
Birmingham (9) C15 ... 5.675
Buffalo (9) R2 ..... 5.675
Canton, O. (23) R2 ..... 6.15
Clairton, Pa. (9) U5 .... 5.675
Cleveland (9) R2 ..... 5.675
Ecorse, Mich. (9) G5 .... 5.675
Emeryville, Calif. J7 .... 6.425
Fairfield, Ala. (9) T2 .... 5.675
Fairless, Pa. (9) U5 .... 5.825
Fontana, Calif. (9) K1 .. 6.375
Gary, Ind. (9) U5 ..... 5.675
Houston (9) S5 ..... 5.925
Ind. Harbor (9) I-2, Y1.. 5.675
Johnstown, Pa. (9) B2 .. 5.675
Joliet, Ill. P2 ..... 5.675
KansasCity, Mo. (9) S5.. 5.925
Lackawanna (9) B2 .... 5.675
LosAngeles (9) B3 .... 6.375
Massillon, O. (23) R2 .... 6.15
Midland, Pa. (23) C18 .. 6.025
Milton, Pa. M18 ..... 5.825
Minnequa, Colo. C10 .... 6.125
Niles, Calif. P1 ..... 6.375
Owensboro, Ky. (9) G8 .. 6.025
Pittsburg, Calif. (9) C11. 6.375
Pittsburgh (9) J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
Riverdale, Ill. (9) A1 .... 5.675
Seattle (9) A24, B3, N15 . 6.425
S. Ch'c'go (9) R2, U5, W14 5.675
S. Duquesne, Pa. (9) U5.. 5.675
S. SanFran., Calif. (9) B3 6.425
Sterling, Ill. (1) (9) N15.. 5.675
Sterling, Ill. (9) N15 .... 5.775
Struthers, O. (9) Y1 .... 5.675
Tonawanda, N.Y. B12 .. 5.675
Torrance, Calif. (9) C11 . 6.375
Warren, O. C17 ..... 6.025
Youngstown (9) R2, U5.. 5.675

BARS, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.725
Bethlehem, Pa. B2 ..... 6.725
Bridgeport, Conn. C32 .... 6.80
Buffalo R2 ..... 6.725
Canton, O. R2, T7 ..... 6.725
Clairton, Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy, Pa. B14 ..... 6.725
Ecorse, Mich. G5 ..... 6.725
Farrell, Pa. S3 ..... 6.725
Fontana, Calif. K1 .... 7.775
Gary, Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind. Harbor, Ind. I-2, Y1 6.725
Johnstown, Pa. B2 ..... 6.725
KansasCity, Mo. S5 .... 6.975
Lackawanna, N.Y. B2 .. 6.725
LosAngeles B3 ..... 7.775
Lowellville, O. S3 ..... 6.725
Massillon, O. R2 ..... 6.725
Midland, Pa. C18 ..... 6.725
Owensboro, Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon, Pa. S3 ..... 6.725
S. Chicago R2, U5, W14. 6.725
S. Duquesne, Pa. U5 .... 6.725
Struthers, O. Y1 ..... 6.725
Warren, O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa, Pa. J5 ..... 8.30
Bessemer, Ala. T2 ..... 8.30
Bethlehem, Pa. B2 ..... 8.30
Clairton, Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse, Mich. G5 ..... 8.30
Fairfield, Ala. T2 ..... 8.30
Fontana, Calif. K1 ..... 9.00
Gary, Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind. Harbor, Ind. Y1 .... 8.30
Johnstown, Pa. B2 ..... 8.30
KansasCity, Mo. S5 .... 8.55
Lackawanna, N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S. Chicago, Ill. R2, W14.. 8.30
S. Duquesne, Pa. U5 .... 8.30
S. SanFrancisco B3 .... 9.05
Sterling, Ill. N15 ..... 7.925
Struthers, O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem, Pa. (9) B2 .. 5.825
Houston (9) S5 ..... 5.925
KansasCity, Mo. (9) S5.. 5.925
Lackawanna (9) B2 .... 5.675
Sterling, Ill. N15 ..... 5.775
Sterling, Ill. (1) N15 .... 5.675
Tonawanda, N.Y. B12 .. 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa, Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet, Ill. P22 ..... 5.675
Minnequa, Colo. C10 .... 6.125
Niles, Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy, Pa. B14 ..... 14.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity, Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 .. 11.75*

Alloy
Ambridge, Pa. W18 ... 10.175
BeaverFalls, Pa. M12 .. 10.175
Camden, N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria, O. W8 ..... 10.175
Monaca, Pa. S17 ..... 10.175
Newark, N.J. W18 ..... 10.35
SpringCity, Pa. K3 .... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge, Pa. W18 ..... 7.65
BeaverFalls, Pa. M12, R2. 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden, N.J. P13 ..... 8.10
Carnegie, Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora, Pa. A7 ..... 7.65
Elyria, O. W8 ..... 7.65
FranklinPark, Ill. N5 ... 7.65
Gary, Ind. R2 ..... 7.65
GreenBay, Wis. F7 ..... 7.65
Hammond, Ind. J5, L2 .. 7.65
Hartford, Conn. R2 ..... 8.15
Harvey, Ill. B5 ..... 7.65
LosAngeles (49) S30 .... 9.10
LosAngeles (49) P2, R2.. 9.10
Mansfield, Mass. B5 .... 8.20
Massillon, O. R2, R8 .... 7.65
Midland, Pa. C18 ..... 7.65
Monaca, Pa. S17 ..... 7.65
Newark, N.J. W18 ..... 8.10
NewCastle, Pa. (17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth, Mich. P5 .... 7.90
Putnam, Conn. W18 ..... 8.20
Readville, Mass. C14 .... 8.20
Seattle (49) S30 ..... 9.10
S. Chicago, Ill. W14 .... 7.65
SpringCity, Pa. K3 ..... 8.10
Struthers, O. Y1 ..... 7.65
Warren, O. C17 ..... 7.65
Waukegan, Ill. A7 ..... 7.65
Willimantic, Conn. J5 .... 8.15
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland, Md. (5) C19. 6.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 .... 9.025
BeaverFalls, Pa. M12, R2 9.025
Bethlehem, Pa. B2 ..... 9.025
Bridgeport, Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden, N.J. P13 ..... 9.20
Canton, O. T7 ..... 9.025
Carnegie, Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora, Pa. A7 ..... 9.025
Elyria, O. W8 ..... 9.025
FranklinPark, Ill. N5 .. 9.025
Gary, Ind. R2 ..... 9.025
GreenBay, Wis. F7 .... 9.025
Hammond, Ind. J5, L2 .. 9.025
Hartford, Conn. R2 .... 9.325
Harvey, Ill. R5 ..... 9.025
Lackawanna, N.Y. B3 .. 9.025
LosAngeles P2, S30 ... 11.00
Mansfield, Mass. B5 .... 9.325
Massillon, O. R2, R8 .... 9.025
Midland, Pa. C18 ..... 9.025
Monaca, Pa. S17 ..... 9.025
Newark, N.J. W18 ..... 9.20
Plymouth, Mich. P5 .... 9.225
S. Chicago, Ill. W14 .... 9.025
SpringCity, Pa. K3 ..... 9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1..5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14..5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2..5.575
ChicagoHts.(4)(44) I-2..5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill. G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U9 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.56
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 Common Coke

	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.85
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed

(Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.60
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md.(10) B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
Los Angeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity, Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	*173*
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	*175*
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt. Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt., Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Sing'e Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa, Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
Chicago Hts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen, Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	
Cleveland A7	17.85	
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'im'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WOVEN FENCE, 9-15 Ga. Col.

Ala.City, Ala. R2	187**
Aliq'ppa,Pa.9-11½ga. J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville(48)K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80††
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c. finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00s, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	—Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.35	43.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	...	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	9.61	10.06	....	10.18	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	8.57	9.98	10.92	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	11.75	....	10.57	9.03	12.98	16.95	9.26	9.35	11.97
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	11.35	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.50	11.20	12.20	61.27	11.20	9.55	14.20	17.35	10.45	9.70	11.70
Memphis, Tenn.	8.98	10.05	....	....	10.64	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	11.09	8.90	11.00	16.30	9.26	8.76	11.03
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.53	11.08	....	10.94	8.77	11.28	16.33	9.14	8.77	10.91
St. Paul	8.84	9.69	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.95
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.85	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):
- Forging $97.00
- Rerolling 78.00

Alloy (N.T.) 115.00

Wire Rods:
- Carbon 5.70
- Alloy 6.40

Wire (carload lots):
- Merchant annealed . 8.40
- Low carbon indus. . 7.20
- Upholstery spring .. 8.55
- M.B. spring 8.85

Bars & Small Shapes:
- Carbon, merchant .. 5.30
- Carbon, special 5.85
- Alloy 6.40

Bar Mill Bands:
- Carbon 5.40
- Alloy 8.05

Bars, Reinforcing 5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade. 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.50
Bronze powder, 90/10.	55.10
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types ..	0.78-1.06
Nickel-Silver	58.70
Solder	7.50*
Stainless Steel, 304 ..	89.00
Stainless Steel, 316 ..	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	24.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.65	$5.90	$5.60	$5.50	$5.80
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.65	5.90	5.60	5.50	5.80
I-Beams	5.60	5.85	5.55	5.45	5.75
Channels	5.60	5.85	5.55	5.45	5.75
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.50	6.40	6.40	6.25	6.60
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O. H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (‡)	6.55	6.80	6.50	6.40	6.70

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65% c.i.f. Atlantic ports ..	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.70-3.20
60-65%	3.25-3.45

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens.	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max, Si 1% max, S 0.03% max, 21.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66%, S 5-7%, C 0.025% max, 31.50c per lb contained Cr; carload, lump, bulk, delivered.

Cr, 65-71%, C, 0.025% max, S, 2% max, 31.50c per lb contained Cr, carload lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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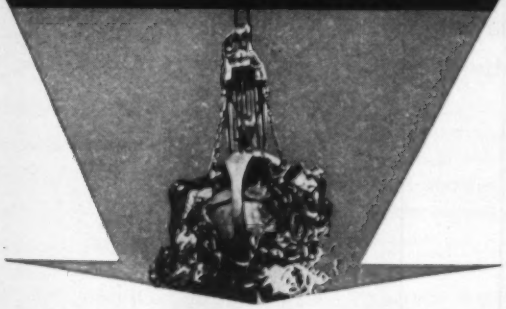

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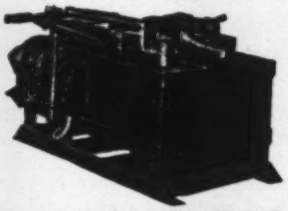
This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radii on the same bar without stopping the machine.



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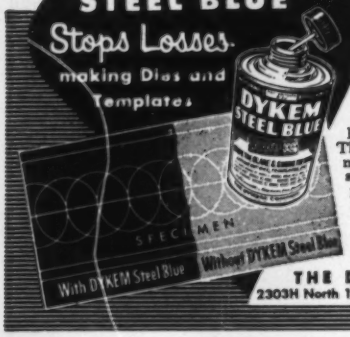

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Scrap Resists Pressure on Prices

STEEL's composite on No. 1 heavy melting steel rises 67 cents to $32.67 despite continued absence of large scale mill buying. Some market support still is being provided by exports

Scrap Prices, Page 118

• **Pittsburgh**—The market is stronger here because of three factors: 1. Higher bids on industrial lists have encouraged dealers to hold out for higher prices. 2. Bad weather has reduced the flow of scrap to dealers' yards. 3. Brokers are facing stiff competition from buyers in surrounding districts. No. 1 heavy melting is up $2 a ton on a purchase by a mill at the edge of the district. No. 1 factory bundles are up $2 on a sale to brokers reported during the week.

• **Chicago**—Higher bids on No. 1 factory bundles to be produced by auto stamping plants this month and price advances in foundry grades provide the only activity in a dull scrap market here. The bids on 5000 tons of bundles were 20 cents higher than those a month ago. On another lot of 3500 tons, the bids were up $1.08. Bids were made by brokers, and observers say the scrap may be destined for export. However, with a freight rate of $2.70 a ton to Chicago mills, the higher bid would indicate a delivered price of $35.09, without brokerage. Low phos plates and the cast iron grades are up $2 a ton dealers report.

• **Philadelphia** — Prices on three grades of steel scrap have advanced $1 a ton, No. 2 heavy melting to $33, No. 1 busheling to $38, and rail crops to $49-$51, delivered. Strength is attributed primarily to good export demand and severe weather, which has made yard collections difficult. Domestic steel mills are not pushing for tonnage; they are showing less interest than they were exhibiting a couple weeks back.

• **New York** — Brokers' buying prices are steady. Domestic consumption lags, but exports of the major open hearth grades are holding up well. The movement of scrap has been retarded by snow and cold weather but not sufficiently to make for a scarcity that would push prices higher.

• **Cleveland**—The slowdown in automobile production is reflected in a decline in auto scrap generation. This, in turn, is pushing prices upward on the industrial grades. Tonnage on the auto lists was off about 25 per cent from a month ago, but prices bid for the material were about $2 a ton higher than at the end of December. The tonnage was split among a half dozen buyers. Some of the material will go to local steel mills, but some may also find its way to export markets. Prices on the dealer scrap list, in general, are unchanged from those recently prevailing.

• **Detroit**—Bids on auto lists held about even with those a month ago though the tonnage offered was 12 to 15 per cent smaller. Quotations on industrial bundles were up 75 cents, but action was slow and no outstanding orders for the material were reported. An indication of the sluggish demand: 7000 tons of bundles were split among four buyers. Dealer activity continues at a sluggish pace.

• **Youngstown**—A district steelmaker bought a tonnage of No. 1 industrial scrap at $35, the same price he paid a month ago. Dealer scrap is priced nominally at $32-$33 for No. 1 heavy melting.

• **Buffalo**—Cold weather has slowed the scrap business in this district. Dealers report little material is moving in or out of their yards. The extreme cold had made operation of handling and processing equipment difficult. Dealers lack mill orders, but are hopeful February business will be coming out soon. Prices are unchanged, but are largely nominal in the absence of sales.

• **Cincinnati**—The market is again showing signs of strength. Prices are up $1 a ton on the open hearth grades, with No. 1 heavy melting quoted $25.50-$26.50. Dealers are anticipating resumption of buying by a district mill. A slight upturn in the steel rate, plus reduced scrap generation explain the new show of strength.

• **St. Louis**—Although little tonnage is moving, the market continues firm. A slight flurry in No. 1 railroad heavy melting boosted the price $1 a ton on that grade to $32. Prices on several other railroad grades were also reported changed.

• **Birmingham** — Prices on some grades of scrap have advanced, but prices on some other grades have declined, so that the market appears somewhat unsettled. One steelmaker has held up shipments against a large scrap order, and a district pipe shop will close down for a week this month. No. 1 heavy melting is down $1 to $32-$33; No. 1 busheling is also off $1 to $32-

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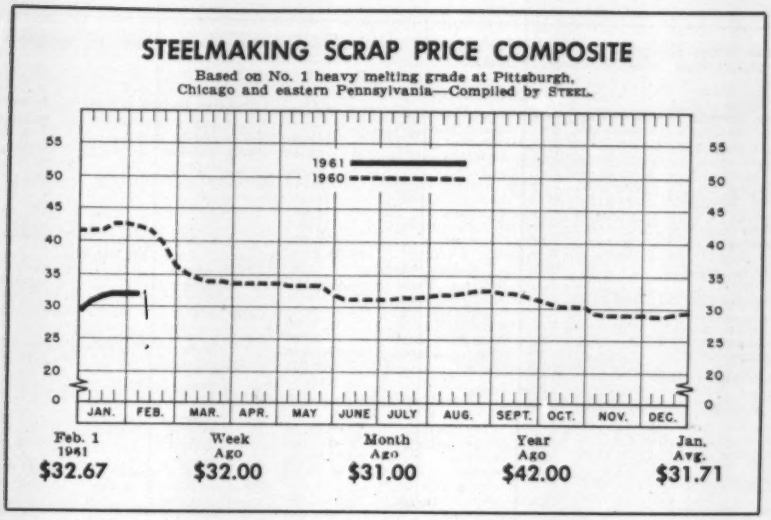

$33; bar crops and plates are up $1 to $37-$38; electric furnace material (2 ft and under) is off $1 to $35-$36; angles, and splice bars are $1 higher at $37-$38.

• **Houston** — Prices are holding steady despite the absence of brisk buying on domestic account. Market support is being provided by exports, as has been the case for some months. Some dealers think demand from the foundries will rise next month.

• **San Francisco**—Demand for steel scrap continues to be slow, and indications are there will not be much change in tonnage movement over the next several weeks. Prices are holding, however, getting support from exports. A further drop in prices, it's said, would discourage tonnage generation.

• **Los Angeles**—Dealers say business is off as much as 50 per cent from normal February volume. Collections have slowed down because of depressed prices. No early pickup is expected.

• **Seattle**—Little change in market conditions is reported. No marked upturn in activity is expected until second quarter, but exports are continuing to provide support. Interest centers in the scrapping of obsolete government ships in this area. To protect U. S. jobs and to insure utilization of equipment in this country, bidders now must agree to dismantle the vessels in the U. S. rather than towing them intact for breakup abroad.

Pig Iron . . .

Pig Iron Prices, Page 112

Merchant pig iron business is running a shade ahead of December's, but it is well below the year ago pace. Some foundries are averaging no more than two to three days a week.

Sellers in the Midwest are in need of bookings to support blast furnace operations. Additional stacks may be taken out of production unless orders pick up. Furnace stocks are heavy and sellers are giving prompt shipments. Area sellers are heavily dependent on demand for iron for automotive and related castings.

Signs of improvement are noted in a few areas. Bethlehem Steel Co. is relighting a blast furnace at its Lackawanna, N. Y., plant. The increase in hot metal needs is due entirely to increased open hearth operations.

Steel Barrel, Drum, Pail Movement Off in November

The movement of steel shipping barrels and drums in November, 1960, totaled 2,506,112 units, down 1 per cent from October's volume but 11 per cent above that for November, 1959, reports the Census Bureau. The total for the first 11 months of 1960 was 28,223,004 units vs. 30,373,812 in the same period of 1959.

Shipments of steel pails in November amounted to 5,207,620 units, 9 per cent below October's total and 3 per cent below that for November, 1959. The movement during the first 11 months of 1960 was 66,948,363 units vs. 74,334,631 in the same 1959 period.

Structural Orders Hold; Shipments Gain in 1960

Fabricated structural steel bookings in 1960 totaled 3,210,489 net tons, practically the same as in 1959 when 3,222,858 tons were booked, reports the American Institute of Steel Construction. December bookings were 222,478 tons, down 8 per cent from the preceding month, reflecting a drop in private industrial building.

Shipments during the year came to 3,426,216 tons, 18 per cent greater than in 1959 when industry operations were hit by the steel strike. December shipments totaled 246,196 tons, down from the 288,685 tons reported in November but 4 per cent above the movement in November, 1959.

Order backlogs as of Dec. 31 stood at 2,064,420 tons. Of that total, 54 per cent (1,116,077 tons) will be fabricated during the four months ended April 30.

Structural Shapes . . .

Structural Shape Prices, Page 107

More public work is coming before the market for figures, giving the structural trade a little lift in this period of seasonal slack. Fabricators, except for small shops, generally hold two to three month backlogs, which should be sufficient to sustain fabricating operations fairly well the rest of the winter.

Competition for new work is keen among the fabricating shops. January bookings were only about 5 per cent above those in dull December, and not much change is in prospect for February. Expectations are the sidewise movement will hold until March when a seasonal pickup should be experienced.

Fabricators have little incentive to order steel ahead. Mill deliveries on plain material range only two to four weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3860 tons, Broadway lift span, New York, Slattery Construction Co., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

2775 tons, state highway bridges, Monroe County, New York, to Ernst Iron Works, Buffalo; Lane Construction Co., Meriden,

(*Please turn to Page* 123)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 1, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 1	$32.67
Jan. 25	32.00
Jan. Avg.	31.71
Feb. 1960	38.87
Feb. 1956	48.96

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*31.00-32.00*
No. 1 factory bundles	*38.00-39.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	11.00-12.00
Short turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	33.00-34.00
3 ft and under	32.00-33.00
Heavy turnings	25.00-26.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	31.00-32.00
Stove plate	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	31.00-32.00
Drop broken machinery	44.00-45.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2 ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Random rails	41.00-42.00
Angles, splice bars	37.00-38.00
Railroad specialties	43.00-44.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*31.00-32.00*
No. 1 hvy melt., dealer	29.00-30.00
No. 2 hvy melting	26.00-27.00
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	30.00-32.00
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3 ft	*35.00-36.00*
Punchings & plate scrap	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	*35.00-36.00*
Unstripped motor blocks	*33.00-34.00*
Clean auto cast	*46.00-47.00*
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	43.00-44.00
Rails, 2 ft and under	45.00-46.00
Rails, 18 in. and under	*48.00-49.00*
Angles, splice bars	40.00-41.00
Axles	53.00-55.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles, solids	165.00-175.00
18-8 turnings	90.00-95.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	20.00-21.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	22.00-23.00
No. 2 bundles	12.00-13.00
No. 1 busheling	19.00-20.00
Machine shop turnings	6.00-7.00
Mixed borings, turnings	7.00-8.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	23.00-24.00
Heavy breakable	22.00-23.00
Unstripped motor blocks	18.00-19.00
Charging box cast	24.00-25.00
Clean auto cast	35.00-36.00

CLEVELAND

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	19.00-20.00†
No. 1 factory bundles	*35.00-36.00*
No. 1 bundles	*29.50-30.50*
No. 2 bundles	16.00-17.00
No. 1 busheling	29.00-30.00
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	31.00-32.00
Cut structurals, plate, 2 ft and under	36.00-37.00
Low phos. punchings & plate	28.00-29.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	28.00-29.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	30.00-31.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	42.00-43.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	49.00-50.00
Rails, random lengths	41.00-42.00
Cast steel	38.00-39.00
No. 1 railroad cast	42.00-43.00
Railroad specialties	42.50-43.50
Angles, splice bars	40.50-41.50
Rails, rerolling	53.00-54.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	150.00-155.00
18-8 turnings	65.00-70.00
430 clips, bundles, solids	65.00-70.00
430 turnings	10.00-20.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	21.00-22.00
No. 1 busheling	32.00-33.00
No. 1 bundles	*33.00-34.00*
No. 2 bundles	20.00-21.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	*34.00-35.00*
Electric furnace bundles	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	27.00-28.00
No. 2 bundles	20.00-21.00
No. 1 busheling	27.00-28.00
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plates, 2 ft and under	37.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	40.00-41.00
Rails, 3 ft and under	46.00-47.00
Rails, rerolling	*55.00-56.00*
Railroad specialties	39.00-40.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.50-26.50*
No. 2 heavy melting	*23.50-24.50*
No. 1 bundles	*26.50-27.50*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*25.50-26.50*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*30.00-31.00*
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

PHILADELPHIA

No. 1 heavy melting	36.00
No. 2 heavy melting	*33.00*
No. 1 bundles	38.00
No. 2 bundles	23.00
No. 1 busheling	*38.00*
Electric furnace bundles	38.00
Mixed borings, turnings	14.00†
Shovel turnings	18.00†
Machine shop turnings	13.00†
Heavy turnings	25.00†
Structurals & plates	38.00-41.00
Couplers, springs, wheels	41.00
Rail crops, 2 ft & under	*49.00-51.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	39.00
Drop broken machinery	48.00-49.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	27.00-28.00
No. 2 bundles	16.00-17.00
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	140.00-145.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	*32.00-33.00*
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plate	*37.00-38.00*
Structurals & plate	36.00-37.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Angles, splice bars	*37.00-38.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	28.00
No. 2 bundles	19.00
No. 1 busheling	28.00
Machine shop turnings	8.00
Shovel turnings	10.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00*
Rails, random lengths	37.00
Rails, rerolling	49.00
Rails, 18 in. and under	*40.00*
Angles, splice bars	*37.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00
No. 1 bundles	34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	35.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	30.00-31.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

LOS ANGELES

No. 1 heavy melting	30.00
No. 1 hvy melt (export)	*34.00**
No. 2 heavy melting	*28.00*
No. 2 hvy melt (export)	*30.00**
No. 1 bundles	25.00
No. 2 bundles	*19.00*
No. 2 bundles (export)	*22.00**
Machine shop turnings	12.00
Shovel turnings	12.00
Cast iron borings	12.00
Cut structurals and plate 1 ft and under	*40.00*

Cast Iron Grades

No. 1 cupola	*39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 2 bundles	19.00
Shovel turnings	13.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable	31.00
Unstripped motor blocks	31.00
Stove plate (f.o.b. plant)	18.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 1 (prepared for shears)	33.00
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	34.00
No. 2 hvy (unprepared)	30.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable cast	33.00
Unstripped motor blocks	30.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	24.00
No. 2 hvy melt, 2 ft & under	22.50
No. 1 bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	23.00
Unprepared	18.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	30.00

*Includes $4 dock charge.
†Nominal.
‡F.o.b. Hamilton, Ont.
‡Delivered.

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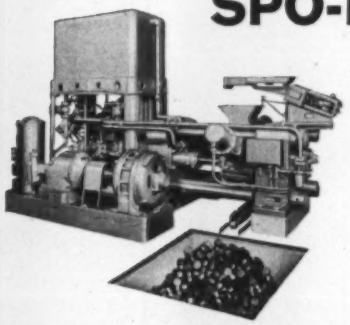
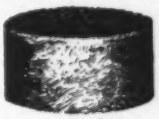
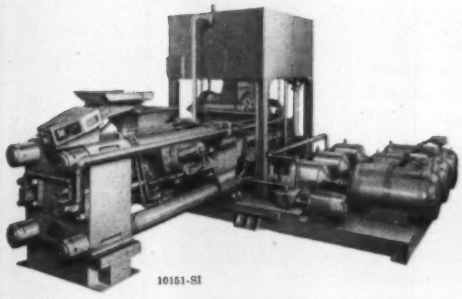




As the metal working industry increases machine tool speeds . . . as automation techniques facilitate faster production . . . more and MORE chips, turnings and borings are formed.

Briquetted scrap sells for more money . . . and this means a briquetting press is a profit making machine . . . a profit unit that operates virtually "operator-free." The advantages of briquetting go even beyond profit. Your scrap will require less storage area. Briquetted scrap is easier to handle . . . cheaper to ship . . . faster to dispose of.

If your machine tool scrap ranges from 4 tons per day to 9 tons per hour, there is a Milwaukee briquetting press that will bring profit to your scrap problem.



10151-SI

We strongly urge you to write today for Bulletin BP-217. It will provide you with all the facts. Send your inquiry to . . .

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

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Inventory Cutbacks May Be Easing

Nonferrous Metal Prices, Pages 122 & 123

THE WORST of the inventory workoff may be about over.

While many metalworking companies indicate they will continue to pare stocks over the next three months, a substantial number plan to add to them.

• **The Future**—Here's what purchasing agents expect three months from now: 74 per cent of users of copper and copper-base alloys will hold stocks at present levels, 10 per cent will continue to cut, but 16 per cent will add to inventories. Among copper wire and cable consumers, 70 per cent indicate they will maintain inventories at current levels, 20 per cent will cut, and 10 per cent will add to stocks.

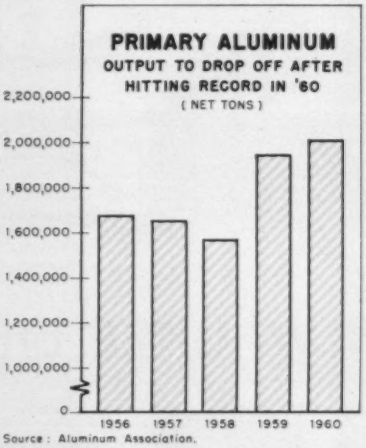
The largest workoff is forecast for aluminum mill products where 24 per cent indicate they will continue to pare, while 8 per cent will add to inventories, and the remaining 68 per cent will hold steady. But 12 per cent of the aluminum ingot buyers plan to build up stocks, while virtually none plan further reductions.

Users of zinc alloys for diecasting are unanimous in forecasting no change in inventories over the next three months. Stocks are at a minimum now, and the auto outlook is too uncertain to encourage much buying.

The inventory picture is brighter than it was three months ago. Stocks are lower for 31 per cent of the copper and copper-base alloy users, for 46 per cent of copper wire and cable consumers, for 27 per cent of aluminum mill product users, for 12 per cent of aluminum ingot consumers, and for 20 per cent of the companies buying zinc alloys for diecasting. The only category that has seen any buildup in inventory is in copper and copper-base alloys where 4 per cent of the users report higher present inventories.

• **Current Stocks**—Inventory plans over the next three months are pretty much explained by the status of current stocks. In copper and copper-base alloys, 17 per cent of the users have less than 10 days' supply, 39 per cent have from 10 days' to a month's supply, 31 per cent have 30 to 60 days, the remaining 13 per cent have 60 to 90 days.

The breakdown for other categories: Copper wire and cable—under 10 days, 29 per cent; 10 to 30 days, 18 per cent; 30 to 60 days, 42 per cent; 60 to 90 days, 11 per cent. Aluminum mill products—under 10 days, 7 per cent; 10 to 30 days, 22 per cent; 30 to 60 days, 42 per cent; 60 to 90 days, 22 per cent; over 90 days, 7 per cent. Aluminum ingot—under 10 days, 36 per cent; 10 to 30 days, 9 per cent; 30 to 60 days, 46 per cent; 60 to 90 days, 46 per cent. Diecasting—under 10 days, 40 per cent; 10 to 30 days, 20 per cent; 30 to 60 days, 40 per cent.



Source : Aluminum Association.

Silver Highlights in '60

The 1960 industrial silver market was marked by lower U. S. consumption, higher usage overseas, increased production, and a stable price, reports Handy & Harman.

U. S. industrial consumption dropped about 3 per cent to 100 million oz, mainly because of reduced demand from the metal joining, electronic, and electrical fields. Yet, because of strong demand overseas, Free World industrial usage jumped about 5 per cent to 226 million oz. Total Free World consumption (including coinage) hit 319.3 million oz, 7 per cent over 1959.

Free World production, though it increased 10 per cent in 1960 to about 202.5 million oz (mainly because strikes in the U. S. had curtailed 1959 output) was still 116.8 million oz under consumption. The bulk of that differential came from the U. S. Treasury which used 46 million oz from stock for coinage and sold 21.5 million oz to industry.

Sale of metal by the Treasury has many silvermen worried. They maintain that by offering silver at 91⅝ cents a troy ounce (delivered), the Treasury is setting the maximum price consumers need pay and thereby discouraging needed production. They also fear that the Treasury's stocks will soon dry up and lead to a possible runaway price (Treasury free stocks dropped 50 million oz, or about 30 per cent, last year and now stand at 123.5 million oz).

Handy & Harman sees adequate silver availability for industry's requirements. Prices over the short term should continue stable as they were throughout 1960. The long range outlook, however, is for a higher silver price, believes the company.

Aluminum Output Slipping

Primary aluminum producers turned out a record 2,014,499 tons in 1960 (see chart). Sales didn't keep pace, falling about 5 per cent, and could drop again this year. Regardless of what happens to sales you can look for output to dip in 1961. Producers have been quietly trimming inventory since late summer in an effort to keep stocks in line. STEEL estimates the industry is operating at around 74 per cent of its 2,466,250 ton a year capacity, or at an annual rate of about 1,820,000 tons.

ONLY VISIBLE BLADES GIVE YOU SAFETY YOU CAN SEE!

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Doesn't it make sense to insist on **V**isible **B**lade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,0000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.
Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.
Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intristic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $208-210 per 75 lb flask.

Molybdeneum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. Ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.
Silver: Open market, 91.375 per troy oz.
Sodium: Solid pack, c.l., 19.50; l.c.l. 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.
Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.
Tellurium: $3.50-5 per lb, 100 lb or more.
Thallium: $7.50 per lb.
Tin: Straits, N. Y., spot, 100.375; prompt, 100.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 37.00; No. 245, 31.50; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 26.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C. R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59 20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 21.25-21.75; No. 2 heavy copper and wire, 19.25-19.75; light copper, 16.50-17.00; No. 1 composition red brass, 17.25-17.75; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	54.13b	51.36c	....	55.32
Yellow Brass	48.10	33.71d	48.39	52.26
Low Brass, 80%	50.65	50.39	50.94	54.71
Red Brass, 85%	51.54	51.48	51.83	55.60
Com. Bronze, 90%	52.98	52.92	53.27	56.79
Manganese Bronze	56.56-56.59	50.22-50.24	60.47	....
Muntz Metal	50.94	46.25	....	....
Naval Brass	52.86	46.67	59.17	57.02
Silicon Bronze	59.49	58.68	58.78	77.90
Nickel Silver, 10%	63.66	65.99	65.74	....
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52

SCRAP ALLOWANCES e

(Based on copper at 29.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	25.000	25.000	24.250
Yellow Brass	19.250	18.375	17.375
Low Brass, 80%	21.375	21.125	20.625
Red Brass, 85%	22.250	22.000	21.500
Com. Bronze, 90%	23.000	22.750	22.250
Manganese Bronze	18.000	17.750	17.250
Muntz Metal	18.125	17.875	17.375
Naval Brass	18.000	17.750	17.250
Silicon Bronze	24.500	24.250	23.500
Nickel Silver, 10%	24.125	23.875	12.062
Phos. Bronze, A-5%	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 16.25-16.75; new brass clippings, 14.50-15.00; light brass, 11.50-12.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 14.25-14.75; brass pipe, 14.75-15.25.

Lead: Soft scrap lead, 6.75-7.25; battery plates, 2.00-2.25; linotype and stereotype, 8.00-8.50; electrotype, 7.50-8.00; mixed babbitt, 9.00-9.50.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 51.00-53.00; rolled anodes, 51.00-53.00; turnings, 39.00-40.00; rod ends, 51.00-53.00.

Zinc: Old zinc, 2.50-2.75; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.50.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.75; light copper, 20.50; refinery brass (60% copper) dry copper content, 20.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.25-22.50; light copper, 20.00; No. 1 composition borings, 19.00-20.75; No. 1 composition solids, 19.75-21.25; heavy yellow brass solids, 15.00-16.75; yellow brass turnings, 13.00-13.75; radiators, 16.00-16.75.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats, 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 117)

Conn., general contractor.

2000 tons, nurses' residence and auditorium, Bronx Municipal Hospital, New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

1996 tons, state bridgework, FALIE 60-2, Suffolk County, New York, through Bellilo Construction Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

1340 tons, state bridgework, Middlesex County, New Jersey, through Public Constructors Inc., general contractor, to the Sun Shipbuilding & Dry Dock Corp., Chester, Pa.; Cornell & Co., Woodbury, N. J., will do the erecting.

1070 tons, state bridgework, FIASE 60-1, Bronx, New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

900 tons, mechanical shop building, Standard Oil Co. (Indiana), a division of American Oil Co., Wood River, Ill., to Mississippi Valley Structural Steel Co., Chicago.

900 tons, transmission towers, Atlantic City Electric Co., Atlantic City, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

785 tons, state bridgework, Route 1004, Sec. 2, Chester County, Pennsylvania, to Mayer-Pollock, Pottstown, Pa.

722 tons, five state bridges, Route 12, Killingly, Conn., to City Iron Works, Hartford, Conn.; Enfield Road Construction Co. Inc., Warehouse Point, Conn., general contractor.

600 tons (including joists), Maidman Motel, 40th St. and 10th Ave., New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

520 tons, warehouse, Goodyear Rubber Co., New Brunswick, N. J., to Schacht Steel Construction Inc., Hillside, N. J.

400 tons, warehouse, Lionel Corp., Hillside, N. J., through J. Lucarelli, general contractor, to Elizabeth Iron Works, Union, N. J.

398 tons, four state bridges, Danielson Connector, Route 12, Killingly Conn., to McDermott Steel Specialties Co., North Haven, Conn.; D. V. Frione & Co. Inc., New Haven, Conn., general contractor; also placed, 133 tons of steel piles to C. I. Guild Co., Providence, R. I.

380 tons, state bridgework, FALIE 60-3, Suffolk County, New York, through Lizza & Sons, Oyster Bay, N. Y., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

275 tons, including reinforcing bars, high school, Milford, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn. (structurals), and Fox Steel Co., Orange, Conn. (bars); Bonvicini Building Co. Inc., Torrington, Conn., general contractor.

250 tons, Toots Shor restaurant and garage, 52nd St., New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

231 tons, building, General Electric Co., Emporium, Pa., through John H. Eisele Inc., to Atlas Steel Products.

200 tons, state road work, charter bus stop, Middlesex County, New Jersey, through Thomas Nicol, general contractor, to Irvington Steel & Iron Works, Irvington, N. J.

STRUCTURAL STEEL PENDING

1500 tons, state highway bridges and a viaduct, Utica, N. Y., through E. W. Winkelman Co. Inc., Syracuse, N. Y., general contractor, to Republic Steel Corp., Cleveland; also placed, 3000 tons of structurals to the Ernst Steel Corp., Buffalo.

6000 tons, second Lake Washington bridge, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; Guy F. Atkinson & Co., South San Francisco, general contractor.

700 tons, apartment, Atlantic City, N. J., to Sweets Steel Co., Williamsport, Pa.

600 tons, state highway bridge, Somerset-Swansea, Mass., to Plantations Steel Co., Providence, R. I., through Marinucci Bros. & Co. Inc., Boston, general contractor.

390 tons, junior college buildings, Rangely, Colo., to K-C Construction Supply Co., Denver; Lembe Construction Co., Colorado Springs, Colo., general contractor; fabricated structural steel to Grand Junction Steel Fabricators, Grand Junction, Colo.

300 tons, addition to General Hospital, Tacoma, Wash., to J. D. English Steel Co., Tacoma; MacDonald Construction Co., general contractor.

200 tons, radar tower, Malmstrom Air Base, Montana, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Nelse Mortensen & Co. Inc., Seattle, general contractor.

155 tons, Washington state overpass, Grant County, to J. D. English Steel Co., Tacoma, Wash.; Concrete Construction Co., Tacoma, general contractor.

135 tons, Washington state bridge, Whatcom County, to Northwest Steel Rolling Mills Inc., Seattle; E. Selene & Sons, Bellingham, Wash., general contractor at $99,306.

REINFORCING BARS . . .

REINFORCING BARS PLACED

7000 tons, Borgia-Butler Housing Development, New York, Terminal Construction Co., general contractor.

2080 tons, subway, Route 101, Sec. 12, 6th Ave., between West 9th and West 19th Streets, New York City Transit Authority, New York, bids Feb. 3.

860 tons, campus building No. 7, State of New York University, Albany, N. Y.; bids Feb. 8.

300 tons, school, Cortland, N. Y., bids Feb. 1.

777 tons, state highway construction, FISH 6-13, Monroe County, New York, to Truscon Steel Div., Republic Steel Corp., Boston; Lane Construction Co., Meriden, Conn., general contractor.

372 tons, five state bridges, Route 12, Killingly, Conn., to Scherer Steel Co., East Hartford, Conn.; Enfield Road Construction Co. Inc., Warehouse Point, Conn., general contractor.

325 tons, four state highway bridges, Danielson Connector, Route 12, Killingly, Conn., to Truscon Steel Div., Republic Steel Corp., Boston; D. V. Frione & Co. Inc., New Haven, Conn., general contractor.

279 tons, T-section, Military Industrial Supply Agency, Philadelphia; bids Feb. 6.

266 tons, wide flange, Military Industrial Supply Agency, Philadelphia; bids Feb. 6.

260 tons, state bridgework, Baltimore County, Maryland; Williams Construction Co., Baltimore, is low on the general contract.

250 tons, air route control, Slidell, La., Electronics & Missile Facilities low on the general contract.

200 tons, express facilities building, Harrisburg, Pa., Ritter Bros., Harrisburg, low on the general contract.

CLASSIFIED

Help Wanted

SALESMAN TO COVER CHICAGO TERRITORY selling mill and heavy industrial overhead traveling cranes. Respond to Box 893, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN TO COVER EASTERN PENNSYLVANIA, Delaware and New Jersey territory, representing a steel fabricator. Prefer man experienced in selling steel and allied products. Send resume to Box 901, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES MANAGEMENT POSITION IN FABRICATED steel and building products lines. Will develop and control sales plans and activities for six divisions of company. Should be 30-45, engineering education, direct sales and sales management experience. Salary and profit-based bonus. Send resume to Box 902, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $20.00, each additional word, .40; all capitals, 50 words or less $23.00, each additional word .50; all capitals leaded, 50 words or less $28.00, each additional word .65. "Position Wanted" set solid, 25 words or less $5.50, each additional word .22; all capitals 25 words or less $7.50, each additional word .29; all capitals leaded 25 words or less $9.00, each additional word .35. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

at Arvin Industries, too...

FEDERAL-WARCO

High volume producers of precision metal products, Arvin Industries consistently get highest quality welds with Federal Multi-gun, automatic resistance welders.

Arvin quality control experts, like those of other leading metal fabricators across the country, know they can rely on Federal resistance welders and Warco mechanical presses to maintain quality and still meet highest production quotas. Precision-engineered to your requirement by:

THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio

Federal® WELDERS

Warco® PRESSES

Federal #58W268 Multi-gun resistance welder in action on Arvin muffler parts.

80 tons, Mark A. Matthews Memorial Bldg., First Presbyterian Church, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Jentoft & Forbes, Seattle, general contractor.

REINFORCING BARS PENDING

2130 tons, also 50 tons of shapes and steel piling, Washington State, four highway overpasses, King County; general contract to Bergeson & Roberts and Earley Construction Co., Tacoma, Wash., joint low bidders at $1,506,154.

975 tons, Washington State, two Puyallup River freeway bridges; Peter Kiewit Sons Co., Vancouver, Wash., general contractor at $2,013,337.

750 tons, spillway, John Redmond Dam, Kansas; bids Feb. 24, to the U. S. Engineer, Tulsa, Okla.

380 tons, U. S. Science exhibits structure, Seattle Exposition; Purvis Construction Co., Yardley, Wash., low at $3,091,736.

350 tons, conversion of Seattle Civic Auditorium; Brazier Construction Co., Seattle, apparently low.

230 tons, also shapes, four Idaho state highway spans, Bingham County; bids to Boise, Idaho, Feb. 21.

225 tons, Washington State highway overpasses, Yakima County; general contract to Calabrese & Son, Mercer Island, Wash., low at $271,410.

225 tons, two state girder bridges, Yakima County, Wash.; bids in at Olympia, Wash.

100 tons or more, Idaho State underpass, Bannock County; general contract to McGregor Triangle Co., Boise, Idaho, at $967,380.

100 tons, conversion of Seattle Auditorium; bids in.

100 tons, Idaho State highway bridge, Gem County; general contract to J. H. Wise & Son, Boise, Idaho, at $78,573.

PLATES . . .

PLATES PLACED

1000 tons, six oil storage tanks, to Carroll Co., Portland, Oreg., low at $633,500 to the Port of Vancouver, Wash.

PLATES PENDING

14,500 tons, 36,250 ft of fabricated water main, ranging up to 109 in. in diameter, for the Susquehanna Water Supply Commission, Harford County, Maryland; C. J. Langenfelder, Baltimore, low on general contract.

617 tons, hull plates, Naval shipyard, New York; bids Feb. 6, Military Industrial Supply Agency, Philadelphia.

602 tons, hull plates, Naval shipyard, New York; bids Feb. 7, Military Industrial Supply Agency, Philadelphia.

554 tons, hull plates, Navy General Stores Supply Office, Philadelphia; bids in; also required, 180 tons of stainless sheets, class 304, finish No. 4.

530 tons, West Delaware Tunnel, Thompkins, N. Y.; Rosoff Bros. & Foster Newman, New York, low on a joint bid.

165 tons, grade Hy-80 alloy, Naval shipyard, Portsmouth, N. H.; bids Feb. 7 to supply officer.

120 tons, two barges, 100 by 32 by 8 ft; bids Feb. 9, to the U. S. Engineer, Savannah, Ga.

100 tons, 300,000 gallon elevated tank, Ft. Rucker, Ala.; bids in; R. D. Cole Mfg. Co., Newman, Ga., is low bidder.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Yugoslav National Railways, 21 diesel locomotives to be purchased in the U. S. with proceeds of a $5.2 million loan from the Development Loan Corp.

RAILROAD CARS PLACED

Seaboard Airline, 25, forty ft, dry-cargo piggyback trailers, to Great Dane Trailers Inc., Atlanta.

U. S. Department of the Interior, Bureau of Mines, helium activity, ten tank cars for railroad transportation of compressed helium, to Magor Car Corp., New York, at $104,733 each.

Advertising Index

Allen-Bradley Co. 51
American Hoist & Derrick Co. 30
Aristoloy Steel Division of Copperweld Steel Co. 55
Armco Steel Corporation, Armco Division ...34, 35

Bailey, William M., Co. 79
Behr-Manning Co., A Division of Norton Co. . 9
Bethlehem Steel Co. 1
Bliss, E. W., Co. .....Inside Back Cover
Branson Instruments, Inc., Ultrasonic Test Division 95
Bridgeport Rolling Mills Co. 58

Cambridge Wire Cloth Co., The 46
Carlson, G. O., Inc. 84, 85
Champion Rivet Co., The 4
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 96
Cincinnati Milling Machine Co., The, Special Machine Division 45
Cleveland Worm & Gear Division, Eaton Manufacturing Co. 36
Colorado Fuel & Iron Corporation, The 29
Continental Steel Corporation 89
Copperweld Steel Co., Aristoloy Steel Division 55

Diamond Manufacturing Co. 90
Drop Forging Association 68
Dykem Co., The 115

Eaton Manufacturing Co., Cleveland Worm & Gear Division 36
Euclid Wood Products Co., The 116

Fairfield Manufacturing Co., Inc. 93
Federal Machine & Welder Co., The 124
Fellows Gear Shaper Co., The 24
Fort Wayne Metals, Inc. 2
Fuji Iron & Steel Co., Ltd. 98

General Electric Co., Large Lamp Department 31
Gleason Works 65
Gulf States Tube Corporation 21

Harrington & King Perforating Co., Inc., The. 10
Heald Machine Co., The .....Inside Front Cover
Hughes Aircraft Co., Industrial Systems Division 28

Jeffrey Manufacturing Co., The 25

Kardong Brothers, Inc. 115

Landis Tool Co. 14, 15
La Salle Steel Co. 11
LeBlond, R. K., Machine Tool Co., The 32
Lincoln Electric Co., The 22, 23

McGill Manufacturing Co., Inc., Bearing Division 52
Meehanite Metal Corporation 86
Metal Blast, Inc. 100
Michigan Seamless Tube Co. 21
Milwaukee Foundry Equipment Division, SPO, Inc. 119
Morse Twist Drill & Machine Co., A Division of Van Norman Industries, Inc. 60

Nicholson File Co. 77
Norton Co., Behr-Manning Co. Division 9

Ohio Knife Co., The 103
Oilgear Co., The 7
Owen Bucket Co., The 115

Pannier Master Markers 91
Peterson Steels, Inc. 125
Porter, H. K., Inc. 59

Republic Steel Corporation 12, 13
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 29
Rolled Alloys, Inc. 92
Russell, Burdsall & Ward Bolt & Nut Co. 56
Ryerson, Joseph T., & Son, Inc. 16

Sandvik Steel, Inc. 81
Sperry Rand Corporation, Vickers, Inc. Division 26, 27
SPO, Inc., Milwaukee Foundry Equipment Division 119
Square D Co. 121
Stamco, Inc. 94
Standard Screw Co. 8
Starrett, L. S., Co., The 63
Sumitomo Metal Industries, Ltd. 115

Thomas Machine Manufacturing Co. 102
Timken Roller Bearing Co., The .....Back Cover
Torrington Co., The 126
Turco Products, Inc. 101

Universal Grinding Corporation 90

Van Norman Industries, Inc., Morse Twist Drill & Machine Co. Division 60
Vickers, Inc., Division of Sperry Rand Corporation 26, 27

Wean Engineering Co., Inc., The 3

Yoder Co., The 6

~ ~ ~

Table of Contents, Page 19

Classified Advertising, Page 123

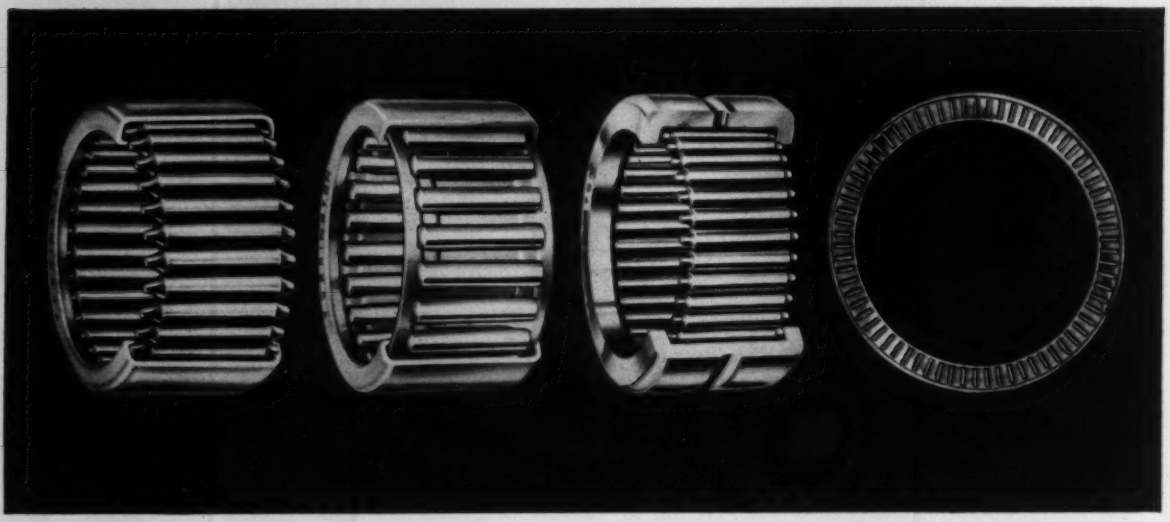
THE 52100 HOUSE

INDUCTION • CONSUMABLE • LEADED

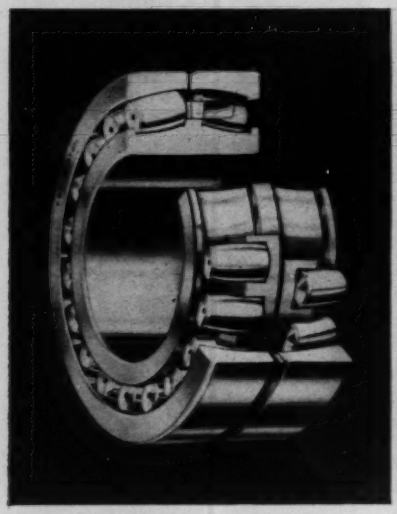
PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

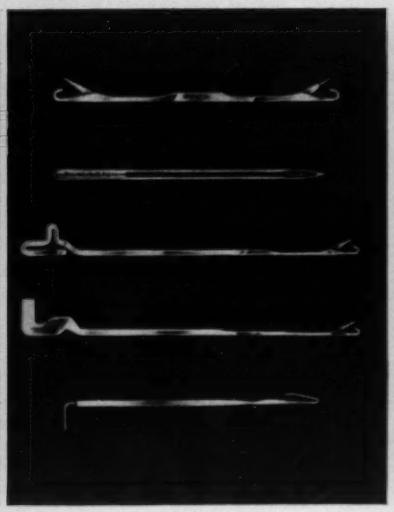
YES, TORRINGTON IS THE PIONEER MANUFACTURER OF THE REVOLUTIONARY NEEDLE BEARING...



BUT THIS, TOO, IS TORRINGTON...



Leading manufacturer of spherical roller bearings for rugged applications in the paper, steel, oil and construction industries



Since 1866 America's largest producer of precision-made machine needles for every need: knitting, sewing, tufting and felting

Originator of the rotary swaging process and largest manufacturer and user of rotary swaging machines in the world

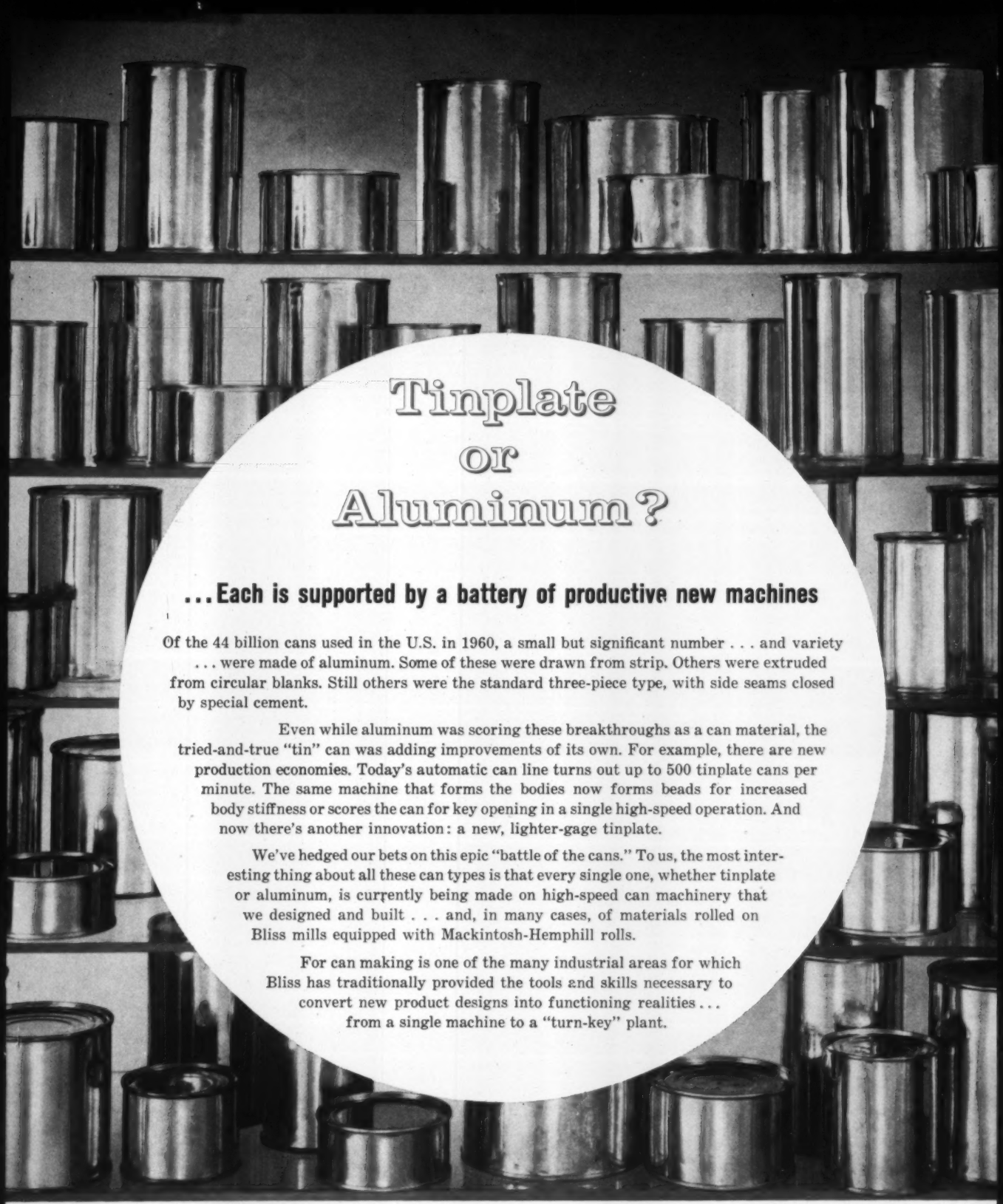
In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Conn.

Serving industry from plants located in the United States, Canada, England, Germany and Italy.



Tinplate or Aluminum?

...Each is supported by a battery of productive new machines

Of the 44 billion cans used in the U.S. in 1960, a small but significant number . . . and variety . . . were made of aluminum. Some of these were drawn from strip. Others were extruded from circular blanks. Still others were the standard three-piece type, with side seams closed by special cement.

Even while aluminum was scoring these breakthroughs as a can material, the tried-and-true "tin" can was adding improvements of its own. For example, there are new production economies. Today's automatic can line turns out up to 500 tinplate cans per minute. The same machine that forms the bodies now forms beads for increased body stiffness or scores the can for key opening in a single high-speed operation. And now there's another innovation: a new, lighter-gage tinplate.

We've hedged our bets on this epic "battle of the cans." To us, the most interesting thing about all these can types is that every single one, whether tinplate or aluminum, is currently being made on high-speed can machinery that we designed and built . . . and, in many cases, of materials rolled on Bliss mills equipped with Mackintosh-Hemphill rolls.

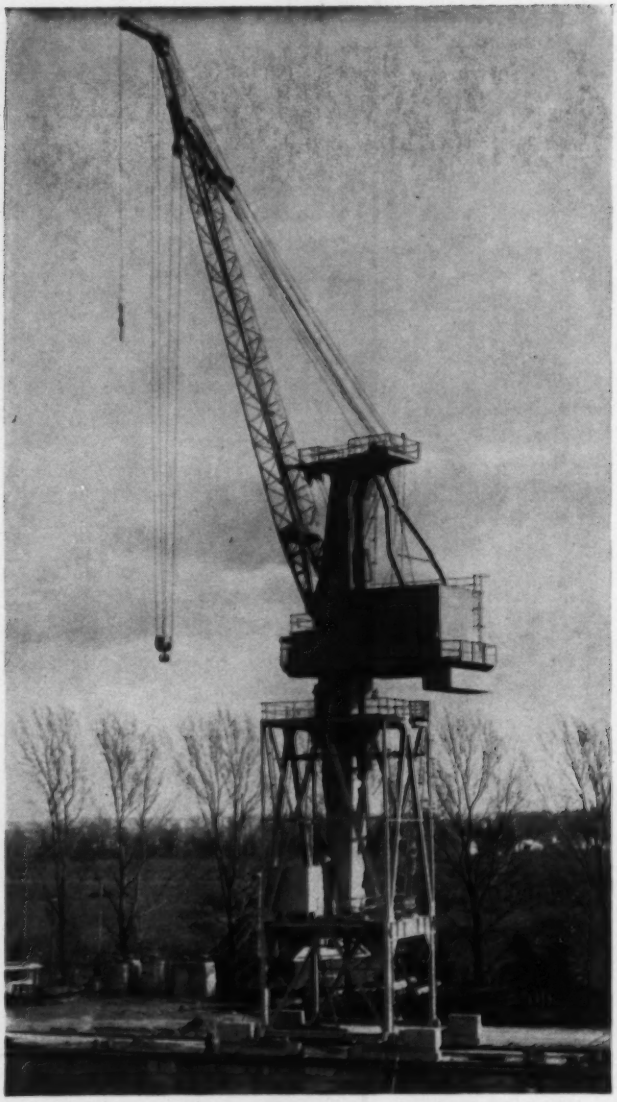
For can making is one of the many industrial areas for which Bliss has traditionally provided the tools and skills necessary to convert new product designs into functioning realities . . . from a single machine to a "turn-key" plant.

BLISS
SINCE 1857

E. W. BLISS COMPANY • Canton, Ohio

PRESSES • ROLLING MILLS • MILL ROLLS • CONTAINER MACHINERY • PUBLIC SAFETY

Timken® bearings help giant Provincial crane take punishment of hoisting 55-ton loads

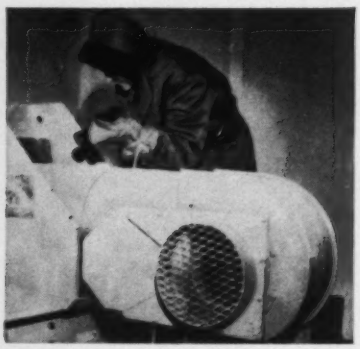


So tall it carries aircraft warning lights, this 20-story high, 55-ton capacity Provincial traveling jib crane handles huge loads at Port Weller, Ontario, ship berths. To take the tremendous, swinging loads, 26 Timken® tapered roller bearings are used at vital points: main hoist gear case, auxiliary hoist gear case, luffing gear case, main and auxiliary hook blocks.

The tapered design of Timken bearings enables them to take radial and thrust loads in *any* combination. Especially important in this application, they take the end thrust from single helical gearing. And full line contact between rollers and races gives Timken bearings extra load-carrying capacity.

The separable components of Timken bearings simplify assembly, too. They permit independent assembly of cone on shaft, cup in housing. Assembly of closely fitted bearing parts does not have to be made by driving through the rolling elements.

ENGINEERING SERVICE ON-THE-SPOT from our graduate engineer salesmen helps you solve bearing problems right at the design stage. You save time and money.



WEATHER CONTROL "LAB". We test bearing performance under all conditions of operation, including temperatures as low as -60°F. to make sure Timken bearings roll the loads anywhere and in any weather.

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TIMKEN®

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The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO." *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ont.